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1918

REPORTS

OF THE

Pennsylvania State Bee-Keepers' Association

BEING REPORTS OF THE

Ninth, Tenth, Eleventh, Twelfth and Thirteenth

Annual Conventions

AND

Summer Meetings

WITH THE LIST OF OFFICERS OF EACH YEAR

Published by Direction of the Association

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Report of the Ninth Annual Convention, Harrisburg, Pa., February 25-26, 1913.

The convention met in the rooms of the Department of Public Instruction, Capitol Building, and was called to order by the president, Dr. H. A. Surface, at 7:30 P. M.

Prayer was offered by Rev. C. Fassold. The minutes were read and approved.

Hon. N. B. Critchfield, Secretary of Agriculture, who was to have delivered the address of welcome, was represented by his deputy, A. L. Martin, who in well chosen words welcomed the bee-keepers to the city. The address was responded to by Rev. Fassold.

The chairman in introducing some of the foul brood inspectors, said that six or eight men during the past summer began inspection work voluntarily and without any expense except to themselves. All the work was done solely for the benefit of humanity. G. H. Rea reported having visited about thirty apiaries, totalling 150 colonies. The disease was more alarming than it was expected. Bees were kept in all sorts of hives and receptacles—nail kegs, whiskey barrels, tubs, etc., and some that were in frame hives had their combs built so criss-cross that they defied inspection. F. G. Fox inspected about one hundred colonies, found some bee-keepers who paid no attention to the crowded condition of hives and consequent failure of a honey crop. Rev. C. Fassold inspected colonies in the section between Pottsville and the Susquehanna River. He found a few wiseacre highbrows who opposed inspection, but through skillful use of the "Dutch" overcame the opposition. As a rule, the work of the inspectors was appreciated and welcomed as a help to combat the scourge which otherwise was destined to wipe out bee-keeping.

A motion was adopted extending Hon. A. L. Martin, Deputy Secretary of Agriculture and members of the Legislature the privilege of the floor.

Penn G. Snyder, of Swarthmore, then spoke on "Breeding For Improvement."

Breeding for Improvement.

The breeding of animals was undoubtedly the first art or general work that was taken up by ancient man with the exception of the necessary search for food and shelter.

In those days meat was the principal diet of all mankind, and as man became more numerous, food in the form of animals he could kill became more difficult to secure.

Most likely an occasional young animal fell into the hunters hands, and if food was plentiful they possibly would try and save it alive—if food still continued plentiful and the animal reached the mating age and produced young it is but a step further for man to realize it would be much easier to produce their meat by having a tame herd.

They would then always have food at hand and they could move about with their stock to where the grazing was best.

It is only one step more to the point where they would locate in some spot where grass was plentiful and try to till the soil in a meagre way with their horses and oxen.

It is understood that this took many thousands of generations to accomplish.

We know animal husbandry runs far back beyond all written history, and even in the primitive days man possessed horses, cattle, sheep and dogs.

With their different varieties of animal life the breeding of the different kinds of animals became one of the chief works of man, and it can be readily supposed the different peoples under different national climatic conditions produced different forms of the same families, such as the great heavy war horses of the German peoples and the light swift Arabian of the Arabs.

Little new was learned on the subject of breeding until modern times.

Many careful scientists absolutely failed to arrive at any sane conclusion on the subject of heredity, or breeding and all the accumulated experiments seemed to make a crazy quilt of the whole subject, as one experiment seemed to contradict one or all the others.

Later the great Darwin published his Origin of Species, and this set the scientific world in a blaze that has hardly died down to this day.

Darwin's conclusions were sound in a great many respects, yet they did not wholly satisfy him or some of the later workers.

It is conceded that like produced like. That a strain or pedigree counted that crosses produced more vigorous issue. And that too great an amount of inbreeding was detrimental.

Although the theory that like produces like was expected it was known that crosses did not produce like.

The issue would possibly resemble either parent or something entirely different, practically a new form.

When such were produced it was generally thought to be a throw-back to some ancient form which possibly was a forefather of both strains comprising the cross mating.

It was definitely known that pedigree counted on the average, because most pedigreed strains of animal life were better equipped for the performing of their respective work than the average of the non-pedigreed.

Despite the fact that crossing or hybridizing produced stronger animals, the breeder realized if he mated a fine pedigree animal to a scrub the issue would contain but one-half (½) of the blood strain of the finer animal or (by Galtin's law only (¼) and each successive out mating from the pedigreed strain would reduce the remaining blood one-half (½) additional.

We can readily see it takes but few crosses such as this to entirely dissipate all the fine points possessed by the pedigreed forefather, and there will be remaining nothing but scrubs or worse than scrubs.

Thus inbreeding seemed to be the only practical way in which a strain could be obtained and maintained.

By this method all our finer strains of farm stock and great numbers of our seed for farm crops were and are being obtained.

A method such as this is very dangerous in the hands of a breeder who does not possess the requisite knowledge of the individual animals he is using for his breeding units.

No two animals possessing the same weakness or defect should ever be mated, as the issue would inherit the same defect two-fold.

Any two animals possessing a trait which is valuable providing they are otherwise perfectly healthy and strong and of the same race no matter how closely related can be mated if of opposite sex.

Thus the good of the trait will be held and intensified in the issue.

The reason it is possible to in-breed is because no two living things are exactly similar, brother or sister, or the issue of a given litter, or the leaves of a tree, or even two combs of honey, they all differ in one or more points.

The variation may be in books or it may be in what we call performance or both. Which translated simply means that the activities which the animal is expected to perform, it may be a production of milk, or the laying of a greater number of eggs by hens, or the ability to make greater speed in horses or to be able to put on more flesh rapidly from a given amount of food.

A living subject must be considered from two standpoints.

What its looks show it to be or seem to be, and what the production or performance may be.

The issue of a long purely bred strain of animal or plant life may be in books or performance or both substantially but never exactly the same.

As all growth is the result of cell division, and as in all bisexual reproductions the new individual is the direct product of the two others it is necessarily different from either of its parents even if they are closely bred.

The modern idea of breeding is to obtain a strain of a pure race whose performance when tested will be above the average of their kind, but especially is it desired that the general average is brought to and held at a high average of production.

There may be cross-bred animals which will produce a greater record than any of the pure bred strain, but it will not transmit these traits to its issue.

If the average of crossed or hybridized stock is examined it will invariably be found to be low, there will be a great range between the highest and lowest and the mean average will be low. This applies to bees as well as Mexicans, they as a race are hybridized from a cross of possibly three races none of which were considered first class, and the result is what General Sherman said of war: Hell.

The honey bee is necessarily much more difficult to breed pure to a certain standard, because of the difficulty of obtaining pure matings as desired. Also the question of parthenogenesis complicates the situation and possibly makes it more difficult to produce a pure strain.

The honey producer must look to the breeder of bees for his greatest improvement just as all lines of animal husbandry look to the breeder of that variety for his breeding stock to improve his flocks or herds.

In one sense the bee-keeper or breeder has a great advantage over all other lines of breeding which man has taken up in the sense that when he has secured a valuable queen there is practically no limit to the number of virgins he can produce from her, and in addition to this he can secure three generations in a single year.

From a pure Italian queen in the beginning of the season the bee-keeper can readily re-queen a yard of Blacks, and if there are not too many Blacks in his neighborhood he can have his whole apiary pure specimens of the purchased strain by the close of the season's work.

His greatest difficulty will be to induce the newly mated queens to lay Drone eggs. This can be induced by giving plenty of capped brood alternating with frames of Drone comb.

On the other hand the breeder of any farm animals must wait from one to three years for each generation, and in this sense progress should be correspondingly slow.

Under present condition the best way for the bee-keeper to mate his virgins purely is to have if possible all the colonies in his vicinity re-queened by his stock, and then have great numbers of Drones flying produced by the best of the strain he has.

As the average bee-keeper is principally a honey producer his first idea is honey, and he will be likely to sacrifice any thing in reason for honey.

His first duty is to see that his bees have plenty of room to store the surplus in and no matter what work he has to do this is the first work of the honey producer. This as a rule prevents him from being able to produce as good an article in queens as the man who makes a business of producing breeding stock.

The successful breeder has the time, the knowledge, and the equipment to take advantage of his productions when he has obtained it.

The breeder is always on the lookout for his ideal and as he produces a hundred virgins to the average honey producer one, he has that many more queens to make his choice from for his breeding stock.

A fair example of how a strain provides its members with the family characteristics can be likened to a man with a huge fortune who invests it in government bonds, the interest of which his family has the use of, and their children and children's children.

Thus the fortune remains the same and his decendants have the benefit of it but as the generations pass on the fortune is distributed in smaller amounts to the individual members because they have increased in numbers.

The fortune as well as his personal characteristics diminish to the individuals as the generations pass on yet the fortune in itself as is the breeding strain just as strong as it was originally.

It must not be considered that the heredity characteristic lies strictly between the offspring and its parents. this is only one link, it lies between the offspring and the whole back ancestry of the strain or family.

So the individual traits or productive powers of an individual must not be confused with the results as a whole. It is not the one individual that counts, it is the combined results of all the individuals comprising the strain.

By continual selection in any direction if long continued the type of the strain will shift and the new form will breed true to its new form.

Or if the breeder is lucky enough to discover a mutant nearer the new form desired he will at that point start a new central point of fluctuation.

No matter how perfect a strain may become there will still be room for improvement although the purer the strain the less variation will be found between its constituents, and so the more difficult it becomes to make advancement.

A queen may be of the purest of a good strain, yet her looks might be such as to make her appear a very inferior bee, but potently she may be the most perfect queen for breeding purposes.

Inheritance is from a strain or race, it is in a large measure independent of its immediate parents if they are of the same family.

All breeding units have inherently in them all the different character units that its strain is capable of producing.

Some characters of a strain may be for some unknown reason more powerful in one individual than in others and so seem different as it really is, yet it can produce relatively the opposite extreme in the resulting offspring.

This is variation, and it is a factor which is found constant in all living organisms.

You will find no two queens look exactly alike, there will be difference in coloring or general construction or both.

The workers will differ within certain limits, in color, gentility, ability to gather honey, strength of wing and length of life.

The drone will vary as much or more than the virgins; yet some people claim there is no advancement possible with the honey bee despite its variability.

The closer the breeding lines are drawn the less extreme variation will be found among the individuals of a strain, as close breeding intensifies the poor as well as the good characteristics. The breeder must be always on the watch for any backsliding in his breeding stock.

Only the very best and strongest of his stock should be used for propagation.

The breeder's object should be Purity of Ancestry by keeping the blood lines pure coupled with steady advancement along the lines that will make for points which will cause the strain to be more valuable in its given ability to produce a greater yield of energy. This extra energy in bees makes for greater yields of honey and better defenders of the colony.

PENN G. SNYDER,

Swarthmore, Pa.

A short discussion followed the address, after which E. R. Root, of Medina, O., addressed the convention on "The Past, Present and Future of Bee-Keeping." He spoke of the experiences of the bee-keepers of fifty years ago, of the first importation of Italian queens, of how Father Langstroh invented the first movable frame and of the invention of the extractor, and how Quinby, the greatest honey producer in New York State, shipped half a car of honey to New York City and broke the market in the early fifties.

The present is confronted by a serious condition—the foul brood diseases. New York at the present time has seven inspectors and an appropriation of $15,000. If this had been done ten years ago the disease would now be under control and thousands of dollars of loss saved. The disease has put 25 per cent. of all the farmer bee-keepers out of business within the last decade. The production of comb honey is less and that of extracted is increasing. Weak colonies will produce extracted when they can not be induced to make comb honey.

The future has a promise for the wide awake man. He urged the farmer bee-keeper to use more lime on his soil to grow more of the clovers, especially the alsike. Sweet clover, which was formerly considered a weed, is now being sown as a forage plant and never fails to

produce honey. He also spoke of the wintering problem, which is now receiving more attention than before.

The chairman appointed as a Committee on Resolutions: Fassold, Snyder and Steele; the Committee on Nominations: Fox, Faucett, and Buseman. The convention then adjourned.

MORNING SESSION.

The meeting was called to order at 9:00 A. M. The secretary-treasurer, H. C. Klinger, made his report, and it passed to the Auditing Committee: Messrs. Weimer, Tillinghast and Faucett.

Mr. E. G. Carr, New Egypt, N. J., the inspector for that state, was introduced, and spoke of the bee-keeping conditions of his state. He said it was a difficult thing sometimes to reform the methods of an old-time bee-keeper and that it was easier to start a beginner right.

The Nominating Committee then reported and the following officers were elected for the ensuing year: Dr. H. A. Surface, pres.; G. H. Rea, 1st vice-pres.; E. A. Weimer, 2d vice-pres.; H. K. Beard, 3d vice-pres.; and H. C. Klinger, sec-treas.

I. F. Tillinghast was then called on, who spoke on "Spring Management in the Apiary."

Spring Management in the Apiary.

Really there are few if any other subjects connected with bee-keeping of more vital importance than that embraced in the words of our caption, Spring Management; and at no other season of the year can a little time and attention be bestowed with a probability of greater return in future profits than now.

No doubt thousands of colonies will weather the storms and succeed in living through the hardest part of the season, until March or April, and perhaps the queen will begin her season's work in earnest, and start a good patch of brood, and then just as nature's supply of food is almost in sight, their increased demand rapidly exhausts their surplus and they perish for the lack of a little time and attention on the part of their keeper.

It is my observation that no other investment is likely to produce greater profit than some stimulative food supplied as soon in spring as the weather permits activity among the bees.

For earliest use, when it is discovered that stores are short, if no frames of honey are at command, as they should be for this purpose, hard sugar candy, or the cube sugar of commerce, laid conveniently above the tops of the frames, will perhaps best help them out. Later a thin syrup should be fed in some form of feeder, even to those that have honey, as it stimulates the queen to the production of early brood; and the chief aim of the bee-keeper should be to build up all colonies to great strength as early in season as possible.

As soon in spring as the bees are flying freely it is our practice to fill some large pans with thin syrup, made by simply stirring about a pound of sugar to the gallon of water, or one part of sugar to eight of water by measure, and locate these some ten rods or more from apiary. The surface of this must be well sprinkled with cut hay, cork chips, or something light enough to float on the surface, on which the bees may alight and load themselves without danger of drowning.

If very thin syrup be thus used it will be taken away with surprising rapidity, without danger of inciting robbery, and will serve the same purpose in stimulating early brood-rearing that would be occasioned by a natural flow from early blooming flowers.

It is a good plan to lead the bees to this by at first placing a piece of comb-honey at the various hive entrances, and when these are well covered with bees, carry them to the feeding place. After getting a few started in this manner, they will return and bring others with them, and soon the whole working force will be as busy as when a natural honey-flow is on.

One objection, however, to this proceeding, is that in thickly settled communities you are quite as likely to also feed your neighbor's bees as your own.

For feeding inside the hive I have found nothing better or less expensive than an inverted Mason quart fruit jar, with half a dozen small holes punched in a small circle in the center of the screw-cap.

Too many or too large holes should be avoided as it is more liable to admit air and induce leakage. These filled with a syrup made by dissolving as much granulated sugar as possible in warm water, are then placed vertically in one corner of the super above the frames, and the packing carefully adjusted around them, for great care must be exercised to keep them packed so as to conserve all the natural warmth at this chilly season. We use a plentiful supply of old carpets, burlaps, etc., and a thick layer of dry chaff above them, and always keep these on until near the swarming season.

Building Up Weak Colonies in Spring.

In making the early spring examination there will usually be found a few colonies which from some cause or other come through very weak in numbers. If queenless these are not worth saving, as their main value will be the empty combs which should be carefully saved from moths and used as soon as possible in tiering up the strongest, as in this manner two good strong colonies will result sooner than in an effort to save the weak one.

But if a good-looking queen be found, no matter how few bees are left with her, she should be saved. If they have very little or no brood, which is probable, the first thing necessary is to give them a frame from some strong colony, putting one of their empty combs in its place.

Now place this weak colony above the strong one with as little disturbance to either as is possible, at first placing both a queen-excluder and a wire-cloth separator between them. Then in a few days carefully remove the wire-cloth, and enough bees will go up through the queen-excluder to gradually equalize them in numbers, so that in a week or two there will be but little difference in their strength, and they may then be separated.

The above proceeding should apply to the very weakest colonies only, such as would require a long time to build up alone. All those which are in fairly good condition may be helped by exchanging empty combs with your very strongest for frames of sealed brood, giving only one at a time, so that they may be properly cared for and not become chilled for want of bees to properly cover them.

By a little manipulation of this kind coupled with systematic feeding during inclement weather, and kept up until there is some kind of abundant bloom, every colony may be put in shape for profitable returns. In fact, this is the time of year when care and attention are most necessary, and any reasonable expense will be returned tenfold.

Feeding Meal as a Substitute for Pollen.

In rearing young brood a supply of pollen is as necessary as is honey, and as little or none is usually carried over winter in the hives, but little brood-rearing usually takes place in early spring until it can be gathered from the willows and maples. Fortunately, however, in most localities such trees abound which blossom about as soon as the weather is warm enough to permit the bees to go abroad; but in some places this is not the case and then the bees will take readily to an artificial product in the shape of ground oats, rye, etc., the mixture which is sold by many millers as "Feed" for horses, consisting of oats, rye, wheat-middlings, etc., admirably answers this purpose; and if a quantity be placed in a sunny, sheltered location near the apiary, it will usually be eagerly sought by the bees and carried to the hives in great quantities. Sometimes we have found it necessary to bait the bees to it by placing a comb with a little honey on or near the meal. But when once they get a start it is really amusing to watch the busy little workers dig into it and form the little pellets on their thighs just as they do the pollen from a flower. Some years ago Mr. Root became very enthusiastic on his discovery that bees would "eat oats," and after feeding bushels gave it as his opinion that brood-rearing was greatly facilitated by its use in this manner. But after the natural pollen appears the bees prefer it and if plentiful will abandon the meal.

Prevention of Swarming.

Natural swarming, which is likely to occur when bees are left to their own inclination, is antagonistic to maximum honey production, and in many cases otherwise objectionable.

It is very frequently a source of annoyance, if not of positive loss, by absconding swarms. Many who would otherwise keep a few colonies of bees are prevented from doing so through a fear that they will come out when no one is at hand to care for them, or will alight in some inaccessible place, or strike a bee-line for the tall timber without ceremony.

For all these reasons the prevention of natural swarming is in most instances desirable, and can most surely be effected by clipping the wing of the old queen and then seeing that she has plenty of room or empty combs to satisfy her desires for unchecked egg-laying.

Our practice is, as soon as the brood-combs are filled, and the queen's laying seems checked, to proceed to "tier up." First take a new hive of equal dimensions, and fill it with empty combs, if we have them, or at least with empty frames supplied with foundation. Remove the old colony to one side and put this in its place. Then open the old one and look for the queen. When found take the frame of brood on which she is seen and place it in the new hive in exchange for one of its empty frames. Place a queen-excluding zinc over the hive containing the queen, and then place the removed body with all its bees and brood above. It is well to have a three-fourths inch hole for direct entrance to the upper part. Now the bees will go to work with renewed vim, and the queen will soon have sheets of new brood below, while as fast as young bees hatch above, the cells will be filled with honey which may later be extracted, and if a super of sections be placed between, honey will soon be going into them.

Still, with this double precaution, an occasional swarm will come out, but the queen, unable to fly, will drop to the ground in front, and now, while the bees are in the air, the alert bee-keeper will take advantage of his opportunity to catch and cage the queen.

If increase is desired, remove the old colony from its stand and put the new hive in its place. The bees, missing their queen will soon return and hive themselves. Liberate the queen among them as they enter and the work is done. This part can now be placed anywhere and they will adhere to the new location; then return the old hive to its former position. If no increase is desired, open the old hive while the bees are out, cut away the sealed cells, which may then be readily seen, and allow them to return from whence they came, returning their queen as before. This procedure will be found far easier and more pleasant than climbing tall trees, and all danger of absconding swarms is eliminated from the program.

ISAAC F. TILLINGHAST, *Factoryville, Pa.*

George M. Steele then spoke on "My Experience with Foul Brood." A discussion followed, bringing out various methods of curing the disease, but the final conclusion was that the only safe method was to shake out on new frames filled with starters. New cures should be tried out by experts and proven before given to the public.

W. W. Case, of New Jersey, then demonstrated "Eradicating Foul Brood Without Loss of a Colony or Honey Crop."

Foul Brood—Its History.

By Wm. W. Case.

As to the origin of foul brood nothing is definitely known, but its history commences with the very oldest history of the "golden" (honey) bee, being referred to by Aristotle as "brood that stunk"; and we find in this country that it was recognized as a factor in bee-keeping by the late Moses Quinby as early as 1835, the probability being strong that the *then* disease was the *now* American variety of foul brood, and we can trace it still farther back in the dim distance in the so-called "luck" of ye ancient bee-keeper with his boxes and straw skeps, it being no more nor less than the ups and downs of foul brood ravages as witnessed even to-day among the ignorant.

The most successful bee men of the long ago were those who commenced by finding a swarm hanging on a roadside bush or tree, a most propitious beginning, indeed, for such swarms to-day, even from infected colonies, always prove healthy if left alone after hiving, a plan generally followed in those days when veils and smokers were very scarce articles—in fact unknown.

Such an apiary speedily from the small and overcrowded hives then in use, swarmed itself into an apiary of a hundred or two hundred hives, all from sheer good luck, but, alas, luck soon changed and almost before he knew it, the owner found himself beeless, but with stacks of empty skeps and vast quantities of wax. Sometimes, in rare cases, luck would last twenty or thirty or even more years, but after bees once became ubiquitous, luck did not generally hold out more than a very few years at most, and as the use of old hives was then universal, luck usually fled to stay and "finis" was sadly written on the last page of the record.

So deeply has "luck" become synonymous with success in bee-keeping that it will take at least one and most probably two generations yet before we will hear for the last time that bee-keeping is neither an art nor science at all, but simply the result of good or bad luck, as the case may be.

Anyone who has ever been through, either successfully or unsuccessfully, an epidemic of foul brood, can easily sympathize with the luckyites, and can just as easily realize that without a movable comb hive and with absolutely no knowledge of our modern germ theory of disease, how easily it was in case of the then "mind your own business and I'll mind mine," Bee, to lay everything in Beedom to luck.

Different Forms of Foul Brood.

At present we have at least two and perhaps three or even four types of virulent brood diseases in America. The American, the specific germ of which is known as bacillis larvæ; the European, caused by bacillis Pluton; and various forms of bad brood called in general pickled brood, some forms of which are undoubtedly due to starvation or chilling, while at least one form seems to pass by successive stages into virulent European foul brood. During the early summer of 1909 bad brood appeared in a New Jersey apiary in a new section of the state, which the Washington experts pronounced nothing but pickled brood, but which so rapidly developed into virulent European foul brood that before midsummer thirty-five colonies had to be re-hived to save the whole apiary from annihilation. (See also report Ontario Bee-keepers Assn., 1908.)

Of the two diseases, the European foul brood is, at the outset, by far the most virulent and destructive, but which is far easier to control, in fact, eradicate entirely than the American variety, while most forms of pickled brood run but a very short course, lose their virulence, and give way to the activities of the bee itself, unaided by man, and disappear. The treatment of both forms, as far as treating individual colonies is concerned, is alike, but the general principle of treating both diseases as a whole will appear radically different later in this article, by which we hope to prove that it is absolutely unnecessary to have any trouble whatever from the European variety, in fact to eliminate it entirely as a dangerous factor in Beedom.

Eradication of European Foul Brood From Both Apiary and Continent.

We find ample proof all through nature that any form of life when attacked by disease not only is aided in resistance by friendly bacteria, but also tends to "sport," by which certain characteristics are developed which tend to render them resistive to such attack, and gradually a fixed strain is developed which is practically or entirely immune from further infection.

People who go from northern to tropical latitudes are especially liable to yellow and other tropical fevers, but from which in course of time their systems fortify themselves, and they, like the native-born element, become also immune. Some types of man are also practically immune from tuberculosis, from their systems becoming fortified against its development, although post-mortem examinations may show many scars of healed lesions of tubercular origin in their lungs, but whose further development the system was able to prevent, and probably all mankind would become immune from the disease were it not that no matter how often such healing takes place, they are subject to re-infection daily, through which means, should the vitality be very low at any given time, the germs multiply to an extent that the system is not able to overcome, and a breaking down of tissues faster than they can be healed ensues which ends eventually in death, although such cases also frequently recover if supplied with sufficient pure air from an outdoor life *and avoid re-infection.* See Note 1.

We have but to refer to the records left by the great Aristotle to learn that in Southern Europe both the Italian (golden) bee so-called, and FOUL BROOD were both ubiquitous *twenty-three centuries* ago, and that the disease was the one now known (and properly) as European foul brood, because the Italian bees to-day

show a strong tendency to throw off the attacks of the disease, in fact, as frequently proven, tend to recover without aid from man and attain a perfect cure.

In the first virulent outbreak of European foul brood in a new section, a careful examination will show the fact that certain individual colonies show much less bad brood than others, such individuals generally proving to be of the very best and most vigorous types of Italians (true also I think of both Holy Land and Cyprians). Now these individual colonies would continue indefinitely practically immune were it not that they are continually reinfected from robbing broken down colonies in the neighborhood, so that they eventually become poisoned to such an extent with the infection that they, too, finally give up and become totally ruined.

But herein lies the solution of the whole problem.

In an apiary say of one hundred colonies in its first virulent attack by European foul brood, re-hiving for awhile yet will probably be necessary, but in treating the apiary select the very best Italian colonies that show the least effects from the disease as BREEDERS. Frequently such colonies will be found with no more than a dozen cells with the disease remaining stationary in spite of rabid infection all around them, and I have had such colonies continue for three years with not more than a dozen of such cells per year—to all intents and purposes immune. Trap every drone from inferior colonies and replace all queens in the apiary from those most nearly immune, and in from three to six years, sometimes even less than three, you will have a strain of bees to all intents and purposes immune from all further ravages of European foul brood. I do not say that you will never have a trace of the disease, for while there are infected bees in robbing distance, you are bound to find an occasional cell which the bees, however, soon clean out. I do say that you will have an apiary against which European foul brood can make no headway whatever, and will make re-hiving merely a record of past history in that apiary. Keep a record of all daughters and constantly reject all strains that have the least tendency to give way before the disease.

The black bee, being in its first contact with the disease, readily succumbs, and it will probably be centuries before they will reach a point where they will also become even in a small measure immune. Hence another reason why the black bee has got to go.

I have had to treat but one colony in the last four years—in summer of 1907. Sixty colonies went through the summers of 1908, 1909, 1910 and 1911 without a break, everything more than holding its own, only a sporadic cell appearing occasionally during all seasons. One colony slightly infected in 1908, the worst in the apiary, died during the following winter from exposure, the wind carrying away both lid and packing. A good swarm from immune stock was hived in it on the old combs in June, 1909, and not a bad cell of brood developed during the season, and during August, 1909, not a foul brood inspector in the United States could have found a diseased cell in the sixty-five colonies, and to-day I live without further fear of European foul brood.

I do not wish to be considered as unorthodox, nor even a revolutionist, but I consider at present that the sooner the bee-keepers face about and start buying queens just as far as possible from "black brood" sections, and go for their queens to those who have successfully gone through the deep waters of European foul brood and *bred out* the disease, the sooner they will reach the point where European foul brood will have no terrors whatever. In fact, own an apiary in which European foul brood can not establish itself and if followed to its legitimate end will eventually eradicate the disease from the continent, in fact, will prove as efficacious in beedom as vaccination has been in the eradication of smallpox in the human race, or inoculation of the apiarist against effects of bee poison. This is not a queen advertisement, as I raise no queens for sale, but would caution that if queens are bought from infected neighborhoods, that her retinue be destroyed and she be transferred to a clean cage with very young bees before introducing, as it is immunity and not disease that you want to introduce into the apiary. As regards the American foul brood, apparently we have no race of bees whose life history for centuries has been spent in contact with it, and if such is the fact, it may be a hopeless task to ever control it on the same lines as above for the European variety. However, certain observations made on the disease during 1912 have somewhat modified by previous views and it may eventually turn out that something can be accomplished in that line, but if so it can only be determined by the most careful and patient experimentation, a thing we would not advise the ordinary bee-keeper to undertake, but to treat all cases of American foul brood by the above method just as soon as diagnosed, and remember that in the diseased apiary only eternal vigilance and action will bring success.

Treatment.

More than twenty years actual contact with the disease in both forms has enabled me to evolve the five following laws governing conditions during treatment and treatment absolutely safe and sane in its eradication and control.

First law—That the adult bee does not carry infection while digesting infected honey; second, that any infected honey stored in the combs during treatment will always cause a recurrence of diseased conditions; third, that normally, bees always leave the hive with empty honey sacks; fourth, that bees on being disturbed in the hive always give more or less honey to their fellows, which, after the disturbance is over, is placed by the field workers in the handiest cells before they again go to the fields; fifth, that at commencement of treatment there must be no comb in the hive in which honey may be stored. From the above five principles the following treatment of individual colonies is obvious, is equally safe in the hands of the amateur as of the expert, and without the loss of colony or honey crop, brood, danger from robbing or of spreading the disease in any way, and applies equally to both forms of disease.

Infected colonies in early spring, if not too far advanced in diseased condition, may cast normal swarms, especially if confined to a single story, in which case the parent hive should be set aside a few inches and the swarm hived on full sheets of foundation on the old stand, after which remove all queen cells from the hive which cast the swarm, return the combs and close the hive bees tight, next bore an inch hole in the end of the hive, over which nail an inch tin pipe bee escape about six inches long, tapering to a point just large enough for a single bee (including drones), to pass out at a time and place the hive in position shown in cut with small end of tube about two inches in front of and above the entrance. It is imperative that the infected colony hived on foundation (or fdn starts) on the old stand must not be disturbed under four and better still five full days, as when the bees start to the fields after hiving, the wax workers will take all the infected honey brought from the old hive and, if left absolutely alone, will digest it all in forming wax, but if disturbed before four days so as to exchange honey, they will before again going to the fields place the honey in the first cells the bees have built, instead of giving it to the wax workers, when it will be fed to the first brood to hatch, this at once re-infecting the colony. Should it be imperative to break the wax cluster from any cause before the full fifth day, all combs built must be removed and fresh foundation given. In the course of about four weeks all the brood in the hive with the pipe escape will have hatched and passed out and united with the parent colony, and as all have left the hive with empty honey sacks, there is absolutely no danger of their carrying the disease. It is perhaps needless to say that the piped hive must in no wise be disturbed until the last bee has hatched and passed out, when it can be removed to a place of safety and the wax rendered at leisure.

Colonies that do not swarm can be shaken on foundation in a clean hive on the old stand, the hive sealed bee tight and piped out as before. In shaking it is best to leave enough bees to care for the unsealed brood, as they will pass out and unite with the treated colony in a short time anyway.

Colonies in box hives, whether diseased or healthy, can be drummed out and transferred with the pipe with no danger of robbing, infection, loss of brood, nor drone brood to dispose of. Neither does it necessitate smashed-up hives and the general muss usually attending transferring, and the wax rendered by a good press will far more than pay for the foundation used, besides the satisfaction of having perfect combs.

I have still to learn of a single failure to cure foul brood by this method when absolutely carried out, either in my own apiary or in those of others who have used the method.

Following the discussion of the address, Dr. Surface recommended the sowing of crimson clover, both as a cover crop and a nectar-producing plant. It gathers more nitrogen than any legume known. Carr said: "Sow it in cornfield and let it blossom the following year and it is worth more than 20 tons of manure to the acre." Steele said it is a great stimulant to brood rearing and that he got a bumper crop of honey from it.

AFTERNOON SESSION.

The meeting was called to order at 1:30 o'clock. The president, Dr. Surface, who was the delegate to the national convention, then reported. The meeting, which was the first one held under the representation system, was interesting, yet lacked the general social feeling and enthusiasm dominating the meetings under the old plan. In representation, Pennsylvania was second to Illinois, the former having a representative vote of 5 to the latter of 6, thus placing our State second in the Union in point of membership.

Roll call followed with a response of 29 members present.

The president asked for new members and explained that the membership fees were $1.00, which included membership in the National Association as well.

F. G. Fox next spoke on "Wiring Frames," giving a new method which E. R. Root said he would publish in *Gleanings* even after he had told his editorial staff not to accept any more articles on wiring.

G. H. Rea gave an address on "The Present Day Bee-Keeper," He said Pennsylvania had greater resources for honey production than any other state. There should be ten colonies kept to where there is now one. Thousands of pounds of honey going to waste. There were five times as many colonies a few years ago as there are now. We have a bee law but we need an appropriation to carry it into effect.

The subject, "Working Out Yards," was discussed by George M. Steele. He said how it was possible to run several out-yards. Root said spread out over your hills. You have a big State. The trouble with some out-yards is they are overstocked. Twenty-five colonies are sufficient for a yard. Do not place them too far apart. Use a small machine—a Ford. Run out-yards for extracted honey to avoid swarming.

The Auditing Committee reported the treasurer's accounts correct and as follows:

Receipts

Balance on hand,	$37 15	
Received for printing letter heads,	1 71	
Cash from advertising,	10 00	
Dues from members,	145 50	
Total receipts,		$194 36

Expenditures

Dues to National Association,	$60 00	
Printing letter heads for G. H. Rea,	1 71	
Printing notices and report blanks,	2 50	
Printing programs, Annville meeting,	2 08	
Printing programs, Harrisburg meeting,	2 87	
Dues to Agricultural Federation,	5 00	
Mailing programs,	4 25	
Envelopes,	75	
Secretary's expenses, Lancaster meeting,	8 22	
Secretary's expenses to Annville meeting,	4 50	
Other postage,	2 29	
Total expenditures,		$ 94 17
Balance in treasury,		$100 19

The Committee on Resolutions then reported as follows:

We the Pennsylvania State Bee-Keepers' Association in our ninth annual convention assembled in the State Capitol building at Harrisburg, Pa., on the 25th-

26th day of February, 1913, beg leave through our *resolution committee* the following report:

1st. That we tender our thanks to the Department of Public Instruction for the use of its assembly room for the use of our session and that such tender be made to them by our President.

2d. That we extend a vote of appreciation to Prof. H. A. Surface for his splendid services in behalf of the eastern bee-keeper, while in attendance at the National Convention and for the inspiring report that he has given of that convention.

3d. That we heartily approve of an adequate state appropriation, commensurate for our needs, and to carry out the spirit and intent of our Foul Brood law.

4th. That we overture the Secretary of Agriculture for some law establishing a time when spraying of fruit trees shall be prohibited in the State.

5th. That we tender to all the patrons from a distance our hearty appreciation for their service upon our program.

6th. That we look with bright and hopeful anticipation for a still more harmonious coöperation of all allied interests in promoting the bee industry of our State.

J. C. FASSOLD,
GEO. M. STEELE,
PENN G. SNYDER.
Committee.

A Committee on Legislation consisting of the following was appointed: Mayor Weimer, Rea, Klinger, Snyder and Fox.

A motion was adopted that all paid up members should be mailed a copy of the printed report.

The President suggested that a contribution be taken for the former manager of the National Association, N. E. France. A sum of $7.52 was contributed which was forwarded to C. P. Dadant, Hamilton, Illinois, who received similar offerings from other associations.

EVENING SESSION.

The meeting was called to order by the President at 7:30. Hon. E. A. Weimer of Lebanon spoke on the "Agricultural Federation." He explained that the organization consisted of the allied agricultural societies and different Associations in the State and the benefits to be derived from the organization. By a combined effort of all these various Associations better legislation can be secured. In asking for appropriation the needs of the different bodies are brought together in a budget. The Federation now asks $3,451,000, of this $5,000 has been asked for the Bee-Keepers' Association and for inspection work.

Changing a Hive.

A paper was read on "Changing a Hive," by Wm. Kernan.

In most all large-sized apiaries, there are very likely some hives that are not quite as good as they once were. I happen to have some eight-frame hives of this kind, and as ten-frame hives seem to be coming into style, I will tell you how I changed a few of these hives to ten-frame and made them as good as new, perhaps better.

I changed them to double-walled chaff hives, but instead of the outer wall being of lumber, I used galvanized roofing tin. As it takes some practice to do a neat job putting on this tin, I will just describe briefly how I went about it, not saying but that there is a chance for improvements, if this material proves to be a good thing.

I first got out some strips of pine about one inch square to go around the bottom and top of hive, and pieces 1x2 inches for the corners. I then marked the hive in the center of the ends and cut it in two. Then I fitted pieces about 2¾ inches in the ends with a groove cut out for the tin rabbet at the top. I found

that a good way for to hold the parts while nailing was to bolt a short piece of plank to the work bench so it will extend out about 18 inches. The two parts of the hive body can be held on this plank while nailing the middle pieces and strips on bottom. I used tobacco pail staples at the top, as the top strips should not be nailed on if we are to fill between with chaff, but a quarter-inch strip at the top will do to hold the pieces together. If we want to nail a piece of molding on the sides to lift the hive by, then we should nail blocks on the side of body to nail to.

I cut the tin in four pieces. In nailing it on I first nailed the tin at the bottom and ends. I then filled in the space with dry sawdust. Then I placed the top strips in on top of the sawdust, and nailed the tin to them. I left the tin so it extended clear over the edge of hive and down over the ends to the bottom of rabbet groove. The top strips should be about one-half inch below the top edges of the hive and the tin bent in and nailed if we use an outer case above for wintering or to protect the supers. This outer case can be made of light lumber and galvanized tin tacked on and the telescope cover can be of the same light stuff. As far as I can tell the bees wintered just the same in these two hives as in the other double-walled chaff hives beside them. They were in the sun last summer and they seemed just as cool as the others, but in the afternoon there was some shade. In packing them for winter I made a honey board of one-fourth inch lumber with two strips nailed at each end. I placed this over the frames and filled the winter case three-fourths full of leaves and paper. Sawdust or anything will do and if they have lots of honey they will winter O. K. The object of the tin is that it is cheaper than lumber and should last longer, needs no painting and if put on right the hive looks nicer perhaps than a painted hive. There might be some objection to this hive that I don't see, as I only tried two hives last winter and this winter, and as lumber is getting scarce it might be a good thing to investigate.

Dushore, Pa.

C. N. Greene spoke on "Master Bee-keepers" and W. W. Case spoke on "Requeening During Swarming" which concluded the program. The place and time for next annual meeting was left in the hands of the executive committee. Geo. M. Steele invited the Association to meet in his apiary near West Chester for the summer meeting and the invitation was accepted.

Dr. Surface concluded the program with an address on "Bees and Bee-keepers," illustrated by a stereoptican.

The convention then adjourned.

H. C. KLINGER,
Secretary-Treasurer.

Report of the Third Annual Summer Meeting, West Chester, Pa., Sept. 6, 1913.

The Association met in Geo. M. Steele's apiary, West Chester, and was called to order at 12 noon by Geo. H. Rea, Vice-President. Wm. Selser offered prayer.

The minutes of the previous summer meeting were read and approved. Forty-eight members answered to roll call.

F. G. Fox gave an address on "Five hundred Per Cent. Increase and a Crop of Honey," and demonstrated how it was possible to make a strong colony give surplus honey and then divide it into six nuclei and build them up into strong colonies until winter. The address was followed by discussion giving various methods of making increase.

The next subject, "How to Get a Large Crop of Honey," was discussed by Geo. M. Steele. The secret of success of getting a large

crop is to begin the previous fall by wintering on plenty of stores and with plenty of young bees.

Wm. A. Selser then read a paper on "Some Peculiar Phases of Bee-Keeping in Florida."

Some Peculiar Phases of Bee-Keeping in Florida.

Florida sustains a peculiar geographic relation to the United States, supposedly being a little projection of land thrown out into the sea, and its original formation being largely of coral reefs. This condition has made Florida very low and flat, resulting in the formation of a large per cent. of the state into Everglades and the inland lake of Okechobee, and in the northwestern section, great inland rivers running from the Gulf of Mexico, as it would seem that a great part of the state, originally the Atlantic Ocean, in which there was a long break over three hundred miles, forming a great chain of rivers and lagoons from St. Augustine south to the Keys, of which the Indian River is the longest single stream.

This brings about the familiar condition of moisture in the soil, so necessary to the successful flow of nectar in plant life, and forms the basis of the scientific theory that I have had in mind for a number of years, that is, the relation of *moisture in suspension and moisture in precipitate*, and when both of these are present, guaranteeing a secretion of nectar.

While there is no relative humidity in Florida that kills, as a case of sunstroke has never been known, the moisture in suspension is the heaviest of any section between the oceans, so far as I am familiar in my extensive travels. The writer is now purchasing instruments to carry on a line of experiments this coming winter, in regard to moisture in Florida, with the existing barometric pressure, and under the atmospheric conditions moisture in suspension becomes precipitate in the form of dew, which is heavier in Florida than anything we have in the North. Many times handfuls may be scooped up from the grass in early morning.

One of the great things to be determined is what relation moisture in suspension and reaching the point when it becomes precipitate and its relation to the sun and temperature that will draw the greatest amount of nectar from plant life, is a wide field for investigation.

As you all know when the air is charged with moisture at a very high temperature and when we say the air is so humid it is almost unbearable, is just when we get our biggest flow from clover in this section. Now there is a scientific reason for this, and I believe Florida has the solution for it, but just in what relation or what proportion, is open to investigation.

Another singular condition of Florida, when there has been no rain for four or five months in the winter season, these air plants which grow on oaks and other places, stretching out their arms from two to five feet, can be turned upside down and water run out almost in cupfuls. The result is that the cabbage palmetto, tupelo and black mangrove seldom fail of a good crop of honey.

Migratory bee-keeping is carried on most successfully in this state, Florida being some 500 miles long. After the crop in the northern part has been gathered, the bees can be moved down the coast via boats in time to gather the crop further south.

Mr. O. O. Poppleton, one of the pioneer bee-keepers of Florida, just retiring, is a marvelous illustration of a successful migratory bee-keeper. I have kept bees in Florida for about ten years, and can say it is one of the nicest and best places to keep bees on account of no winter problem, and it is such a pleasure to work outdoors with them every day throughout the year.

A call to lunch was then heard and all did justice to the hospitality of Mr. Steele and his wife.

After lunch Penn G. Snyder gave a demonstration in queen rearing according to the Pratt method.

Dr. E. F. Phillips who made strenuous efforts to reach the meeting and had been delayed by poor street car service just now came into the apiary and spoke for some time.

Harold Hornor then talked on "Extracted Honey." Mr. Hornor

is making a success of this article. One thing to which he attributes his success is that of requeening every fall after the honey-flow.

H. K. Beard gave a talk on "Transferring." He described the different methods among which is the Heddon method which he says takes longer but is preferable on account of getting nicer and straighter combs.

G. H. Rea who is one of the Foul Brood Inspectors spoke on "Bee-Diseases," and gave some of his experiences in the field.

A motion was adopted, thanking Mr. and Mrs. Steele for their entertainment. The convention then adjourned.

H. C. KLINGER, *Secretary.*

Report of the Tenth Annual Convention, Harrisburg, Pa., Feb. 20-21, 1914.

The meeting was held in the Lecture Room, Department Public Instruction, Capitol Building, and was called at 1:45 P. M., by Dr. H. A. Surface, President. Secretary of Agriculture, N. B. Critchfield offered prayer. In the absence of some of the speakers the first fifteen minutes were occupied in open discussions. Secretary Critchfield said he bought honey which had a bitter flavor and wanted to know its source. It was answered that the nectar likely came from Prickly Ash.

H. P. Faucett of Brandywine Summit, read a paper on "Comb and Extracted Honey from the Same Apiary."

Comb and Extracted Honey in the Same Apiary.

H. P. Faucett, Brandywine Summit.

It is the aim of the bee-keeper to have his colonies strong for the early honey flow. To keep them strong for the main honey flow in our changeable climate is what we have to work for. To do this I find it best to use extracting combs.

In 1912 our first surplus honey flow was from locust; the blossoms contained a great amount of nectar, but the weather was too cold for the bees to build comb in sections. I placed a few cases of sections on and covered them up nice and warm; they filled the bait combs but refused to work on the foundation.

I gave all colonies that were strong enough a full body of extracting combs, with a perforated zinc honey-board between. They immediately took possession of these combs, filling the bodies full, giving me about 40 pounds per colony. By this time the weather began to get warmer; alsike and white clover blossoms commenced to appear. I raised all extracting bodies and placed a case of sections between them and the brood chamber. The extracting combs were left on long enough for the bees to start to draw out the foundation in the sections, then they were transferred to other lighter colonies to ripen.

In examining the brood chamber of the colonies on which the sections were placed, I found it was a mass of honey with very few cells for the queens to lay in—an ideal start for swarming, but a bad condition for the main honey flow.

The brood chamber on which the extracting combs were placed was one solid mass of brood.

The season of 1913 was so cold that bees did not work on locust, but poplar blossoms, secreting an immense amount of honey, many colonies securing 50 pounds. This honey being dark and not very saleable, I again placed extracting combs on all colonies, placing the sections on when the flow was nearly over. By doing this I secured all the white honey in sections.

The poplar blossom honey was extracted to be fed in the fall for wintering. The empty combs were placed on colonies run for extracted honey.

The roll was then called finding a good attendance.

The minutes were then read and approved after which the Secretary-Treasurer made the following report:

Receipts

Balance on hand,	$100 19	
Receipts from advertisers,	40 00	
Cash membership dues,	91 00	
Total receipts,		$231 19

Expenditures

Printing envelopes and letter heads,	$4 05	
Printing programs for meetings,	4 97	
Envelopes and paper,	65	
Freight and expressage,	1 39	
Printing due postal cards,	2 00	
Printing annual report,	157 50	
Secretary's expenses to Harrisburg meeting,	6 30	
Secretary's expenses to West Chester meeting,	10 84	
Stamps and postage,	17 15	
Total expenses,		$204 85
Balance on hand,		$26 34

Messrs. Shope, Shilling and Faucett were appointed as the auditing committee. The committee later in the session reported the accounts correct.

F. G. Fox spoke next on "Economical Increase."

Economical Increase.

F. G. Fox, Pipersville, Pa.

FELLOW BEE-KEEPERS: At the beginning of this all-important subject, I wish to state that the most of the work here exposed was not done in a strictly scientific manner. It was a special condition that I had to contend with and I had to devise special means and take a big risk in doing this work. And above all I wish to state that I did not do this work to tell about. Our secretary is a very persistent fellow and kept on after me to fill a place on the program that I was compelled to give something I had done to meet his requirements.

I think I am perfectly safe in asserting that we are all, *more* or *less*, interested in this very important subject of increase, and that 99 per cent. of us belong to the class that are *more* interested. Once in a while we meet a man who has bees enough but they are as scarce as the farmers who have manure enough to satisfy all their needs. One of our members last year told me that he had all the bees he wanted but he had over a hundred colonies which he was running in one yard for comb honey and they were about all he could care for.

Most of us are apt to have some few losses along the way, caused by dysentery, "spring dwindles," or the brood diseases, which we would like to make up. Then too there is the outyard bee-keeper with his extracting yards, if he is not very careful the number of colonies in these yards will steadily decrease till he has few remaining.

The desirable condition for increase is a favorable honey flow, and if I had a choice I would take a long drawn out flow in preference to a short heavy one. The flow is essential to easy queen rearing, to building up nuclei, and to prevent robbing.

But, my friends, to work a small yard to the limit for increase and at the same time procure a good crop of honey is a hard proposition and you must do like the Jew did. Isaac and Jacob had long been good friends but had drifted apart for some time. They met one day on Broadway. Vy Isaac, said his friend, vere have you been? I haven't seen you for a year or more. Vy, Jakie, I have been to Chicago. Vell, Isaac, did you make any money dere? Yes, a little. How much? dollars. Vy, Jakie! Two dousand dollars in one year, how did you make so much? make all dat? Vy, with bees and honey. Oh, good-by. Another year rolled around

and again the friends meet unexpectedly. Vell, vell, Jakie, vere has you been; I don't see nothings of you for a year? Vell, Ikie, I have been to Chicago. To Chicago, vat you do dere? Did you make any money? Yes, I made two dousand dollars. Vy, Jakie! Two dousand dollars in one year, how did you make so much? With bees and honey. How's that I onlay made one dousand with them and now you makes two? Vell, Ikie, I tells you how it is, I puts in electric lights and works dem day and night.

So it is with this subject of increase and honey from the same yard, you must work the bees both day and night and then some.

To tell you how I got caught in this tight corner I must do a bit of history which is full of discouragement and errors. About 75 per cent. of the failures were due to poor seasons. In the spring of 1910 I got hold of a bee yard located along the River Delaware, about a mile from our home. The bees were in several types of hives. They were in-bred mongrel stuff and about as cross as they could be made. The owner was away from home most of the time and the swarms took care of themselves or were picked up by neighbors and put in most anything that would hold bees. As I was trying to breed better bees and as there was quite some disease in my vicinity, I thought it high time to get these bees under my control.

I transferred them to ten-framed hives, using full sheets of wired foundation, increased the 9 to 15, got 120 pounds of honey, and left them in what I would consider apparently well supplied with stores for the winter. This yard is located on an eastern slope of a hill about one-fourth mile from the river and the winter problem has never been serious there as the most of the cold winds were broken and early brood rearing was assured.

On the 16th of the following March there were 12 colonies alive and I hoped to come through in good shape. But many of you may have cause to remember the spring of 1911, with its long drawn out cold weather. Well, when warm weather did come and the apple blossoms with it, there were just three colonies alive in the yard. Many of them had died out with honey in the hives. That season was a very poor one for us. I left the bees clean out the empty hives and cared for the combs. I increased them to eight and took no honey from them. Then followed another disastrous winter and when the spring of 1912 dawned there were just two colonies alive and they were in a poor condition.

Of course I was somewhat discouraged, for the loss of the bees meant that I had just one of two things to do, either to pay the owner for the lost bees at a good price or make good by replacing them. I kept pretty dark for the time and tried to avoid crossing the owner's path more than necessary. But after thinking the matter over I resolved to endeavor to make good with the bees. In fact this was the only thing I could do.

I had plenty of hives and drawn comb that was free from disease. On May 28th one of the colonies was obliging enough to swarm. They were hived on the old stand and the ten frames of honey and brood divided up into five nuclei, each with one or more ripe queen cell. These young queens all mated successfully and were soon building up at a good pace. In fact they gave me several frames of brood to make more increase with. Not much brood was taken from the other old colony. Occasionally I would remove a frame to keep the queen laying. In this way I increased from the original two to eleven colonies, then one small second swarm came to the yard. This built up for winter but never did anything for itself in the line of brood or honey to spare.

Later I extracted 130 pounds of honey, took 25 pounds of comb and left one extra ten-framed hive body full of honey at the yard, making in all about 100 pounds of surplus honey to the colony, counting the original colonies.

On October 12th I made my last visit to the yard. I equalized the stores and fixed the hives up for winter and bid the bees farewell till spring.

One beautiful spring day in March, 1913, I made a visit to this yard to take an inventory of stock. Eleven of the colonies answered roll call, but one of them had lost their queen. I gave them some eggs and brood and they soon had a laying queen which did excellent work the following season.

I find by looking at my notes that I visited this yard during the five and one-half months of bee weather, ten times. During the honey flow or rather swarming time, I tried to visit it about once a week.

While this yard, from a financial standpoint, has been a losing proposition to me thus far, it has been the means of giving me a lot of varied experience, and this I hope to turn into cash later on.

Many people believe that because a thing has never been done it is an impos-

sibility, but it is often a good thing not to know a thing cannot be done, for then we will sail in and by doing some things different than ever before, we may succeed.

Somebody said it couldn't be done,
But he, with a chuckle, replied
That "Maybe it couldn't," but he would be one
Who wouldn't say so till he tried.
So he buckled right in, with a trace of a grin
On his face. If he worried he hid it.
He started to sing as he tackled the thing
That couldn't be done—and he did it.

Somebody scoffed: "Oh, you'll never do that;
At least no one ever has done it,"
But he took off his coat and he took off his hat
And the first thing we knew he'd begun it;
With the lift of his chin and a bit of a grin,
Without any doubting or quiddit,
He started to sing as he tackled the thing
That couldn't be done—and he did it.

There are thousands to tell you it cannot be done;
There are thousands to prophesy failure;
There are thousands to point out to you one by one,
The dangers that wait to assail you,
But just buckle right in with a bit of a grin,
Then take off your coat and go to it;
Just start in to sing as you tackle the thing
"That cannot be done"—and you'll do it. —*Anon.*

This was discussed at some length until the discussion drifted to wintering and finally to stimulative feeding of honey and artifical pollen.

Buseman, Huber and Beard were appointed Committee on Resolutions; and Dr. Surface, Klinger, Barner, Coons and Rambo, on the legislative committee.

The Committee on Question Box, Fox, Rea and Shope.

The nominating committee, Fox, Buseman, Beard, A. N. Coons, and Rea.

A motion was adopted that a bill be framed against spraying trees in bloom and amended that this committee join with a similar committee appointed by the Horticultural Society.

Evening Session.

Meeting was called to order by the President at 7:30.

Hon. N. B. Critchfield, Secretary of Agriculture delivered the address of welcome. He spoke for some time in a humorous vein giving his early experience in maple sugar making when a boy. He said bee-keepers were doing a great work for humanity and adding to the wealth of the nation by saving the nectar placed in the flowers.

Dr. Surface responded and spoke of the work done by the inspection force

G. H. Rea then gave "Experiences of an Inspector." He found the work interesting, meeting all sorts of people. He found as many as fourteen kinds of hives.

The most unique hive was a steel frame with glass on two sides. One day he walked eighteen miles and inspected 305 colonies. As many as forty-five colonies in a single apiary were all diseased. One

bee-keeper had thirty-nine colonies, all infected, and yet was totally ignorant of it. The inspection work met with universal approval wherever he went.

The President, Dr. Surface, next delivered his annual address and spoke on "Better Keep Bees, Keep Better Bees and Keep Bees Better."

Better Keep Bees; Keep Better Bees; Keep Bees Better.

Address by Prof. H. A. Surface, President Pennsylvania Bee-Keepers' Association.

Each person with proper ambition is interested in learning how to improve his business. The bee-keeper is no exception. He, with others engaged in the humble and honest pursuits of life, will be glad to take for his motto:

"'Good, better, best.' Never let it rest
Till your 'good' is 'better,' and your 'better' 'BEST.'"

As this very broad subject comprises three sub-topics, each will be discussed in turn, respectively.

(a) Better Keep Bees.

By this we do not mean that every person should keep bees, any more than we would recommend all persons to keep poultry, or go into the fruit-growing or trucking business—even considering the success that might attend many persons entering such pursuits. No doubt, in many regions more persons could enter into the bee business and obtain successful results, but it needs much more than a good "locality" to make a successful bee-keeper. Before I could conscientiously recommend a person to enter into the business of bee-keeping I should know much of his nature, tastes, capacity, training, experience, ability to handle details at the right time and arrange for events long before they occur; besides his local environment and other conditions.

The man who would "better keep bees" is the one who has not been *keeping* them, but rather letting them keep themselves—letting them go unkept, swarming away to realms unknown, dying in winter from lack of protection, and dwindling in spring from lack of care; producing a quarter crop of honey instead of a full crop, measuring his success by the number of swarms he gets rather than by the amount of swarming he controls, and consoling himself with the statement, after a colony dies, "Well, the wax is worth something, anyhow!" (Incidentally, the most valuable wax in the world to the bee-keeper is not that rendered from combs left by dead colonies, but that from cappings sliced from abundant stores in the process of extracting a heavy surplus.)

The bee-keeper, whoever he is, should be a bee *master*. I like the latter term, in common use in Europe—as it implies mastership or control. He should be able to do with the bees as Darwin's gardener said the great scientist did with his plants: "Make them do things." He should be able to keep his bees at home, keep his colonies strong, make them build up at the right time, keep them from loafing, control their swarming "impulse" (whatever this may mean) by removing or obviating those adverse conditions that cause swarming, make them be ready for the good nectar flows in his own region at the right time—and he should do as much as he expects of the bees, and be ready for the same. He should know (or soon learn) how to keep his bees gentle instead of cross—as by re-queening cross colonies—how to breed from his best colonies, etc., and how to tell when the surplus is ripe, and extract or remove it then only.

The person who does not know these things, or who is not willing to learn them promptly and act accordingly, should not attempt to "keep" bees, because he can not. This, like many another business, depends more upon the individual than upon the environment or the kind of business, but no person can hope for eminent success as a honey-producer who does not first learn to "keep" bees in all that the term implies. Hence, "Better *keep* bees."

(b) Keep Better Bees.

Yes, in many cases this is possible. Many persons appear to regard all bees as "just bees," on the same ground that a farmer poultryman, when urged to improve his flock, said, "Why, chickens is chickens!" But it is true that there are

''bees'' and ''bees.'' Some are cross and some gentle, some are lazy and some active, some forage early and some do not, some forage far and some do not, some build up readily and some dwindle, some lay up surplus while others in the same apiary may be drawing on their stored account.

The successful bee-keeper soon learns that there are ''better bees'' and he learns how to keep them. He gets queens from various reliable sources (not for color, but for nectar-gathering ability and mildness), and tries them, learning which give progeny most nearly suiting him, and then having obtained ''better bees'' he breeds from the best. He learns that the control of the drone in his bee yard is as important as the control of the queen, and lets no drones hatch and none live excepting those from colonies that by their good works, have measured up to the required standards in honey production and gentility. It may even be advisable to obtain permission to cut out the drone comb and trap the drones from neighboring bee yards, in order to clear the air of undesirables. The exchange of a good queen works wonders, sometimes.

Unless the drones in the neighborhood are so controlled that only those fly which come from really good colonies, it becomes half folly to attempt to improve the bees by introducing virgin queens; for if they mate with scrub drones their progeny is half scrub stock. Where it is impossible to limit the flying drones to those from select colonies the only way to equip the apiary with better bees is to introduce only queens that were mated before shipping.

Let the beginner remember that Italian bees are generally mild, while blacks are not so very bad, but hybrids are liable to be quite cross, while Cyprians and those with any Cyprian blood may have business ends sharper and hotter than needles. A single cross colony in the apiary may cause constant annoyance for the owner and visitors, as well as be a menace to live stock. ''Keep better bees'' by discovering and eradicating the irascible colonies, removing their queen and introducing a better.

The chief object in keeping bees is to produce honey. When a keeper purchases queens he has no personal knowledge of the record of their strain, and he must experiment by trying them in comparison. Having found his best producing colony, his next important step is to breed from this colony only.

The method of doing this is not an essential part of this paper, as the person who does not know how to take a single mated queen and work his entire apiary over into pure bloods from this queen had better learn how before he progresses much further in the bee business. There are several ways to build up the apiary quickly with queens from select colonies. Consult the bee books for these. Do not be unduly attracted by advertisements of highly colored bees. If you want beauty, plant roses, but if you want honey keep good Italian bees, of a working strain, fairly gentle, but not necessarily selected and bred for color alone. Remember, a colony may be strong one year and weak another as the queen becomes older or is changed.

(c) Keep Bees Better.

To ''Keep bees better'' means to make that progress in the art of bee-keeping that is being made in all lines of human activity, and that is justly expected of progressive mankind. We have the wealth of the world's experience at our command. In these days of modern journalism and specializing nothing very important occurs in any part of this great earth that long remains concealed. Our modern bee journals note the progress in this industry. The man who really would do better must learn from his own experience, and from that of his neighbor, and indeed from all mankind. It is true that he should also learn to sift the grains from the chaff, and to use only that which is applicable to his needs and conditions.

The way to ''Keep bees better'' depends greatly upon what has already been done, upon conditions, and upon ''locality'' (again). What is to-day ''better'' for one man is not even ''good'' for another. It should scarcely be necessary to say that bees should be kept in modern frame hives, with all fixtures in the same apiary of a uniform ''make'' or pattern, so parts will be readily interchangeable. It is almost impossible to practice modern methods of manipulation where this is not the case. I have seen bees kept in modern hives, but with combs made and left so crooked (through lack of foundation starters) that modern manipulation was entirely impossible. Of course, in such a case there is no virtue in the modern frame hive.

The better keeping of bees implies the right use of modern equipment, not only in regard to hives and uniform standard supers, but also all other needed apparatus, such as traps for queens and drones, queen excluders, bee escapes, extractors,

modern uncapping knives, ripening vats, etc. For example, a good large smoker may cost a little more than a cheap toy-like article, but it will hold a large quantity of fuel and be ready to control the bees at a critical and unexpected time when the little smoker may have burned out and become useless. Such things do happen, and on such occasions better equipment becomes a part of the art of keeping bees better.

Yet, however good may be the equipment, it will not bring satisfactory results if not properly used. Therefore, better methods must be considered. Not only is modern equipment worthless if not used, but it may prove seriously objectionable, as in the case of some Ally queen and drone traps that were placed on hives early in the season to trap drones and neglected. They did their work so well that they trapped not only drones but also queens that came out to swarm and young queens that came out to mate, and left the colonies entirely queenless and ruined.

The modern reversible bottom board, with one side higher than the other, may be a good thing when rightly manipulated, to give ventilation in midsummer when needed and to give room for dead bees to drop away from the frames in winter indoors, but if the entrance is left wide open during cool nights of fall or outdoors during winter it becomes a decided curse instead of a blessing.

The extractor is a good thing when properly used. By its right use the apiarist who knows how and acts accordingly can produce much more honey and produce it easier than without it; but if, in his ambition to expedite matters, he extracts green or unripe honey, the result will be a product of second quality, poor in flavor and prone to sour easily. There is such a thing as ''better honey,'' and it must come from better or more perfect ripening before extracting (in the case of extracted honey) or before removing from the hive (in the case of comb honey).

To ''Keep bees better'' means to do all that is possible to carry out the one fundamental motto, ''Keep your colonies strong.'' Besides the use of modern equipment, I unhesitatingly pronounce this as the greatest factor in bee-keeping. The great bugaboo of winter losses is almost entirely overcome by strong colonies of young bees, well provisioned, and fairly protected. The big yields of surplus (the objective point in bee-keeping) are always made by strong colonies.

To get strong colonies important items are, good queens and slow or stimulative feeding in the fall and again in the spring. Start the stimulative feeding early in the spring and continue it steadily. Do all that is possible to get the colony strong and keep it strong during the nectar flow. If increase is desired divide and feed after the nectar flow. Do not reduce the honey yield by dividing the colony during the flow. Suppress swarming by giving plenty of room and ventilation, rather than by weakening the colony. Make the hive boil over with bees, and give space in supers, and they will be filled. H. A. S.

Morning Session.

The meeting was called at 9:15 by Vice-President G. H. Rea.

The Question Box was opened and the following were discussed:

How can wax be whitened? Use sulphuric acid and cool slowly.

What is the best plan for wintering weak colonies? Don't winter any. Double up in the fall. Inspector Rea answered by saying: Pack the colony well, giving it plenty of stores and then put it in the cellar.

The Inspectors then reported having inspected 6,977 colonies, found 774 infected, most of them with American Foul Brood.

R. L. Coons, of Coudersport, then spoke on ''The Coons Hive and Honey Production.'' Mr. Coons is the largest producer of honey in Pennsylvania.

The Coons Hive and Comb Honey.

R. L. Coons, Coudersport, Pa.

Having been requested by the secretary of the Pennsylvania State Bee-Keepers' Association to explain the merits, if any, of the Coons' low hive, I would say that it was designed to take advantage of the swarming impulse, and it is the unanimous

verdict of all who have this hive, that they would rather the bees would swarm than not.

There have been many attempts made to control the swarming impulse, but as far as my experience goes, none of them have been unqualified successes. With myself, it used to be the bane of my bee-keeper's existence for a swarm to issue from a colony, when they were nicely at work in the super. I presume that many of you have been in the same boat, more or less. With us it has been the rule that when a new swarm has filled a full sized hive, the season is nearly over, at least for white honey. With my half-size hive, we take advantage of the natural swarming impulse, get more and nicer honey, increase our stock of colonies, and re-queen naturally, about one-half of our bees every season. In my regular hive I use all frames, 16½x7½ inches inside measure, which we find to be the size best adapted to our locality for the production of comb honey, if we are to use a hive containing about the usual space for a brood nest.

Now our low hive, which I have here, contains just one-half the brood space that our regular hive does. The way we use the low hive is thus: when a first swarm issues, we take a low hive filled with frames containing full sheets of foundation, and one with no frames in it, set the one containing the frames on the empty one, and set both on a bottom board. Then get your swarm, remove the hive filled with frames, shake the bees into the empty one, and immediately put the hive with frames back on the empty one. The reason we use an empty hive is that one can hive two or three swarms in the same time that it would take to hive one, should an empty hive not be used. Shade the swarm well and let it stand until evening, then remove the empty hive, being careful not to smash bees as usually there is quite a bunch of bees adhering to the bottom of the upper hive.

Should the swarm be set down in the morning or during the heat of the day, they are much more liable to absecond, than if set down in the evening, as it is we hardly lose one per cent. After getting your swarm nicely hived go to the hive from which the swarm issued, remove the super and place it on the new swarm, putting on a queen excluder first. We find that the new swarms will store more, and better filled sections of honey, than the parent colonly would had it not swarmed. The apparent reason is, that the queen uses practically the entire hive for brood rearing, forcing the bees to store their honey in the super. Also by taking the honey from the bees as soon as completed, if they have very much surplus ahead. Thus they will search farther afield for nectar, and at times when other swarms, from weather conditions or otherwise gather little or no honey, they will sometimes gather it quite freely. However, should there come a dearth of honey, they will require feeding to avert starvation. Now as to the later management, we run the bees in the low hive until the honey season is over, then as the hive is too small to winter in successfully, we double them up, putting two swarms together, placing the best one above, as we have found from repeated experiments that the bees invariably keep the queen in the upper hive. If you do not want any queens killed, you may remove one before uniting, being sure to place the hive with queen uppermost, thus having a surplus of queens for your own use or for sale. We double them up at any time after honey season is over, and do not have any trouble with their fighting, in fact doing this when there has been several inches of snow on the ground. The bees winter quite as well after being doubled as they would had they been in a regular hive, and in many cases we think better, since they have access to all parts of the hive, from the center of the brood nest. The half hive requires more attention than the average bee-keeper gives his bees, consequently I would not advise any one not giving their entire attention to the business to adopt this style of hive. Now as to the best way to handle bees to get the most comb honey, I approach the subject with caution. It depends so much upon locality, and the one handling the bees. I think all bee-keepers will agree that the hives should be full of bees when the honey flow commences. As to the method of getting the bees strong in the early part of the season, we all have our own, but as they change so much with locality I do think it best to enter into a discussion about the merits of the various systems in vogue, but rather what has been the most successful with me. I think, however, that the bees should have plenty of pure, good honey, enough to last them through the winter and to carry on brood rearing to the fullest extent in the spring. To attain this result one must have a comparatively large hive, and the swarm must be protected from cold and sudden changes in the weather, in fact, we do not remove the winter packing until the time to put the supers on at the beginning of the honey flow. We do not disturb the bees in the winter more than is absolutely necessary, and no more in the spring than to properly inspect them. We use full section starters, believing it

to be false economy to do otherwise. The hive, super and winter case which I use are of my own design, not being able to get what I required from the regular stock patterns. I really believe that my super is the best, taking it altogether, for the production of comb honey, than any other which is at present in use. We can take finished sections of honey from any part of the super without breaking them and without any delay or bother, in fact, we take the honey off as soon as it is completed, thus getting the very highest grade of honey and keeping sections in all stages of development in the super at the same time. My super contains fifty sections, 5x3½x1½ inches which, when glassed, weigh approximately fifty pounds. However, the super is adjustable and is equally as good for an eight or twelve, as for an eleven-frame hive. I do not double tier except under exceptional conditions.

In conclusion I would say that attention to details is the greatest factor in success. Be sure to have everything ready when wanted, and do not delay doing anything which should be done, as a day lost by the bees is never regained. Eat, drink, sleep and live with your bees, for close attention is the price of success in all business, including bee-keeping. R. L. COONS, *Coudersport, Pa.*

Dr. E. F. Phillips, of Washington, D. C., who just came from the National Bee-Keepers' Convention, first gave a report of the meeting. The National Association at this time is going through a transitional period of changes in officers and policies of operation. Conflicting theories were advanced as to its future management and work but these were harmonized and a feeling of coöperation prevailed. In the convention eighteen bee-keepers' associations were represented. Dr. E. F. Phillips then read a paper on "Two Essentials on Honey Production."

Two Essentials in Honey Production.

Dr. E. F. Phillips, Washington, D. C.

To those who have been present on the previous occasions when I have had the pleasure of attending the meetings of this Association it may seem almost incredible that I am not again scheduled to talk on some phase of the subject of bee diseases. For some years the energies of the office in the Bureau of Entomology with which I am connected were almost exclusively devoted to this subject, since the brood diseases of bees hung over the bee-keeping industry like a dense, dark cloud and the condition seemed an emergency demanding our best efforts. To-day, your State and many others have attacked this problem with vigor, as it was hoped would be the case, and now the men in our office may feel somewhat more free to investigate and to discuss other problems which are, in a sense, just as important, and even more fundamental but which lack the character of emergencies. In a sense, this change is a most welcome one.

In what will be said to-day, however, will not be found the results of our investigations. In fact, if you analyze carefully what I shall attempt to explain, you will probably find no facts which most, if not all, of you do not already know. My apology for coming before you with such an array of well-worn facts, if an apology is needed, is a desire to justify the conviction that bee-keepers often do not distinguish between the essentials and the non-essentials in bee-keeping and that therefore bee-keeping as an industry has not developed as it should. This is no more true in Pennsylvania than in most of the East, but our western co-workers are probably compelled to make this distinction more than we are. If then I attempt to preach what is already known it is because some of us fail to practice what we know and this is not peculiar to bee-keepers.

In this preachment I presumably should have a text and I have chosen one from our greatest inspiring, if not inspired, practical authority. In the *American Bee Journal* for December, 1913 (pp. 405-407), Miss Emma M. Wilson reports on the work and results of the season of 1913 in the apiary of Dr. C. C. Miller, Marengo, Ill., in which she is a most efficient helper. Briefly the results are as follows: From 72 colonies, spring count, the average crop was 266.47 sections. One colony produced 402 sections, while only ten colonies produced less than 200. Doctor Miller's previous high record was 300 sections, but 20 colonies surpassed this, 15 producing between 300 and 360, while the last six had records of 383, 384, 384, 390, 395 and 402, respectively.

This is a wonderful record. Several factors combined to produce this result and we may first of all give due credit to an exceptional flow of nectar, weather suitable for gathering and to a most efficient lot of bees. The bees are really entitled to more attention than they will receive at this time, for they are the result of breeding carried on by Dr. Miller for about five years, and in this he has had encouraging success. However, assuming a great flow of honey and good bees there is one other factor which in importance overtops the rest. This factor is Dr. Miller. Other bee-keepers were in localities where there was a flow of nectar just as good, others had good bees, perhaps not so good in most cases as his, but the others did not produce this crop. I should feel entirely justified in coming before you simply to praise Dr. Miller, for he has done more to improve and in fact to make our system of comb honey production than any other living bee-keeper. This is, however, not my purpose. It will pay us perhaps to find out how he did it, for there can be little doubt that there are other bee-keepers who can do as well if their efforts were as well systematized.

The two essentials in honey production to which reference is made in the subject announced are: (1) getting bees of the right age in time for the harvest, and (2) keeping these bees in the proper physiological condition so that they get the maximum crop. The other things that bee-keepers do may in this arbitrary classification go into the class of non-essentials for the present. These two essentials are, however, so overwhelming and comprehensive that they include many manipulations.

I. Getting bees for the harvest. Bees breed in the summer, provided nectar and pollen are available, but a colony does not always reach its full strength in time to get the maximum amount from the earlier of the large flows. Plenty of northern bee-keepers find strong, vigorous colonies at the close of the clover flow when they do little good (unless there is a later flow) but usually it is only in the apiaries of good bee-keepers that we find strong colonies on time. This problem is essentially a northern one, for in the South and in the tropics there is less difficulty of this kind. To some extent the problem is confined to the comb honey regions for comb honey is best produced under conditions of heavy rather short flows such as are found in the North.

A bee-keeper cannot decide on May 1st that he will solve this problem. This decision must be made the August before and in fact some of the most important steps are taken in the Fall. Adequate stores must be provided so that breeding may continue rather late to permit the colony to go into winter strong in young bees. This is so well known as to make one hesitate to say it again but the importance of such provisions cannot be overestimated.

Having obtained a strong colony of vigorous bees, the winter problem next confronts the bee-keeper. No other problem is so full of seeming contradictions and perplexities and no other is so difficult of solution, because of the difficulty of studying the needs and activities of the bees without producing abnormalities. Likewise no other problem in the ordinary routine of the apiary is so important when we consider the enormous loss in numbers and vitality of colonies that bee-keepers experience every year. If we could but dream of a condition in the distant future when colonies would come out of winter quarters almost as strong in number and vitality as they are when they go in, we might indeed paint rosy pictures of what could be done the following year. Indeed we lose from five per cent. to fifty per cent. (or even more) of all our colonies outright and those that remain are decreased often fifty per cent. in numbers and sometimes those bees that still live are deficient by fifty per cent. in vitality. The enormity of these figures is scarcely realized by most bee-keepers.

However much I should like to tell you the key note to success in wintering I cannot. There are a few practical considerations which can perhaps be put in a new way. There are two ways to winter bees, out-of-doors where they are free to fly in good weather and in-doors where they are protected from violent changes in temperature but have no opportunity for flight. Probably most bee-keepers in New Jersey winter out-of-doors but I have a feeling that with an increase in the number of professional bee-keepers we shall see more cellar wintering. In any event, the following considerations are pertinent. It is difficult to conceive of a colony suffering in the fall because it is packed too soon, of a colony having too much honey in winter or of a colony being injured by leaving the protection on too long in the spring. Similarly can we conceive of a colony injured by excessive packing? The whole series of confessions and observations recorded by bee-keepers point to the facts that they usually delay packing too long, they too often provide the minimum of stores and they not unfrequently unpack and

manipulate too early in the spring. Of course in some of these statements I am going contrary to some of the teachings of my good friend Mr. A. C. Miller, who is with us, but I think he will agree with me at least in the idea that whatever is done should be done before severe weather and that a bee-keeper does not help matters by opening his colonies in cold weather. We read of feeding colonies in the winter to save them and of opening colonies when snow is on the ground to see if they are short of stores. These things are within the range of possibilities but they should be considered only as a last expedient in case of dire and unexcusable emergency. There is full justification for calling such manipulations bad practice. I can conceive of no condition when a properly wintered colony can be helped by any manipulation from the bee-keeper between December 1st and April 1st, and, except for a fear of being considered eccentric, I should move the first date up a full month and often put the final date a month later.

These statements apply to out-of-door wintering. We cannot speak so definitely of the cellar. There is a tendency in these days to keep cellars warmer than formerly, probably due in large part to the influence of Doctor Miller, and we can at any rate say definitely that a damp cellar is bad. There is also a tendency to put the colonies in the cellar earlier. The air should be dry enough so that condensed moisture will not appear on the bottom boards. Certainly we can apply our ideas on manipulation by the bee-keepers to the bees in the cellar for here again the bees are entitled to a rest while they are inside. There are no conditions which justify cellar manipulations except in an emergency.

After the long fight with cold is over the colony must begin another almost as severe. Brood rearing may be said not to occur normally until toward the end of the winter and, in general, the longer it can be avoided the better, up to the time that the days are warm enough to permit frequent flights. When it does begin it necessitates the production of heat sufficient to keep the brood chamber at a high temperature and this means increased consumption of stores. Then the bees must have an abundance of honey and they should have frequent flights. They should have every opportunity to conserve the heat generated which means that they should not be manipulated except when absolutely necessary. We come now to the much discussed question of spring manipulations to induce brood rearing, such as stimulative feeding and spreading of the brood. Can any better stimulation be conceived than fifty pounds of honey available for consumption? This is so much better than a pint of thin syrup occasionally or perhaps daily that one wonders why there is any discussion about it. As to spreading brood, it is avowedly dangerous, and with a good queen and bees that have wintered well we may expect the bees to rear about all the brood they can cover. Can we ask more of them? If a colony has plenty of stores and plenty of room in a well protected hive, they will provide the bees necessary later.

By these methods the increase of the brood occurs in a manner which we can describe as rational, not by fits and starts. It results in a balanced colony which as we shall see later is of great consideration.

The bee-keeper cannot overemphasize the necessity for plenty of bees and when we see the miserably weak colonies that are often found in the north one may well understand why such poor financial returns are often received. The small hives, lack of protection and shortage of stores are reasons enough for this condition. Have you ever seen colonies wintered in two hive bodies well supplied with honey and well packed come out in the spring? It does one's heart good just as it is painful to see a colony exposed in a single Danzenbaker or eight-frame hive-body, short of stores and weak in numbers just when strength is the one essential. Bees are capable of withstanding great hardship but it is all at the expense of the crop of the next year.

If ten thousand bees will gather ten pounds of surplus honey, arithmetic alone might indicate that 70,000 bees will gather seventy pounds of surplus. But 10,000 bees will probably almost go hungry while the 70,000 are piling up a nice surplus for their owner. However, the 70,000 must be on time for if they arrive a few weeks too late they are consumers and not producers. Furthermore a weak colony in the spring may often be almost starving while its strong neighbor colony will not only be in better shape for the future but it is often gathering from some mysterious sources enough to live on. Strong colonies in the spring are actually less expense to maintain than weak ones.

And when the time comes to put on comb honey supers the strongest colonies do not delay in getting started in the supers as do the weaker ones. They may need to be encouraged with bait sections but the chief difficulty in this

regard is in persuading colonies to work in sections when they are too weak to do it economically.

II. Keeping the Bees in Proper Condition. In all the work that is done in the spring to get colonies strong before the honey flow the bee-keeper is usually laying up trouble for the future for the stronger colonies are those most likely to swarm. The old conception of success in bee-keeping was a large number of swarms; the present ideal is none at all. To revert to our text; Doctor Miller's increase in 1913 was two colonies and I dare say he would have been satisfied with none at all. It is no longer necessary to prove that colonies which are preparing to swarm or which do swarm gather less surplus than those of equal strength which make no efforts along that line. This is proven repeatedly and may be considered almost axiomatic.

Mr. Demuth in his bulletin on Comb Honey (Farmers' Bulletin No. 503, U. S. Dept. Agric.) makes a careful analysis of the various methods employed in the control of swarming and I shall not discuss this in great detail but shall refer you to this bulletin which every bee-keeper should read. In brief the methods may be put in three classes, as follows:

1. *The removal of the queen.*—This method was formerly advocated more than at present and the general plan was to replace the same queen after a few days. This method may also be used to advantage in re-queening. It must be remembered that while earlier in the season it is desirable to have all the brood possible this is immaterial when swarming usually occurs, since the eggs laid then will usually not have time to be transformed into field bees until after the early crop is gathered. This depends on local conditions however, and necessitates an individual decision for each location. The fact that queenless bees often do not work with vigor must also be considered.

2. *The removal of brood from the hive.*—We find this principle involved in the making of artificial swarms and its various modifications and also in the various mechanical devices brought forward from time to time of which the Hand bottom board is a late example.

3. *The separation of the queen and the brood within the hive.*—This principle is found in the caging of the queen and in the placing of frames of brood above an excluder.

On further anaylsis Mr. Demuth points out, for the first time, the fact that the one thing which all those manipulations have in common is a cessation of the emergence of brood for a time.

It must be admitted that while we know that certain conditions are conducive to swarming it cannot be said that the cause of swarming is known. In Mr. Demuth's analysis there seems to be a ray of light, however. If the emergence of brood is a factor in swarming, it seems probable that we may at least as a working hypothesis assume that too many young bees in the hive is the cause of the phenomenon, probably too many nurses and wax builders. This theory was advanced years ago by Gerstung, a celebrated German bee-keeper, and while it cannot be admitted as proven it fills the needs of a tentative hypothesis as no other theory so far advanced does. There is not time now to review this subject in detail but taking into consideration the large mass of facts that a study of swarming presents in different regions of the United States we may look on the theory as more than speculation.

In any event it may be pointed out that the relatively slow increase in the amount of brood by the methods advocated above seems less likely to induce swarming than does rapid increase by stimulative feeding and spreading of the brood.

In the production of comb honey probably more costly mistakes are made in the manipulation of the supers than anywhere else. Here reference may be made to our text for Doctor Miller is a master in the handling of supers. A too common method is to put on a super when the combs of the brood chamber begin to whiten at the top; then when this one is full it is removed and another empty super is put on. This leads to no end of trouble. The illustration on page 406 (*American Bee Journal*) of Doctor Miller's apiary during the flow shows that he had on at least some of his colonies as many as seven supers at one time. He advocates in a heavy flow keeping an empty super on top while there is still room below and at the next operation the top super is put next to the brood chamber and a new one put on top. In this way there is always room for honey as it comes in, and room to ripen it and by the time a super is needed for storage the foundation has been partly drawn. He also always has room for the young bees to loaf (or secrete wax) and they are not down in the brood chamber to

make trouble. The bee-keeper must know the location so well that he can estimate the probability of the continuation of the flow. When the close of the flow is near at hand, he must, of course, contract the super space. Before this time arrives however it will be well to follow the following plan which I quote from Mr. Demuth. "Place each newly added super next to the brood chamber and keep the one nearest completion just above it with all others arranged above these two, the one in which least progress has been made being on top."

If the comb honey producer will supply himself with the number of supers needed and will have faith enough to put on enough in the proper arrangement, his crop will be materially increased. To have only one or two supers per hive is however inviting a loss and inducing swarming.

It may be objected that it is only by crowding that fancy and extra fancy comb honey may be produced. No contrary arguments will be presented but the fact will be fully admitted. It may, however, be asked when it has been shown that the bee-keeper gets enough more for fancy than he does for No. 1 to justify him in excessively crowding his bees and thereby materially reducing the crop.

Avoiding the non-essentials.—Bee-keeping is peculiar in its fascination. Few other businesses attract amateurs as does this one and, in fact, the majority of bee-keepers are engaged in the business primarily for pleasure. To idly watch the bees at work, to do for them the dozens of little tasks which seem called for, to speculate on the returns they will yield us and especially to study the intricacies of their behavior and other natural functions are some of the pleasures known to all of us. We like to do these things and when such pleasures no longer exist there will be a great reduction in the number of persons who begin bee-keeping.

But when bee-keeping becomes a business the bee-keeper must become a business man and "put away childish things." Some of the fun disappears when we are driven by the essentials to the elimination of non-essentials, but in all such things the point of view changes the outlook. The pleasure of studying activities gives way to the pleasure of accomplishment in a practical line. Perhaps the amateur enthusiast is engaged in as laudable a work as the honey producer but if one is a honey producer, depending on honey for his livelihood, then the non-essentials which are often pleasures, must go or efficiency suffers.

An instructive story is told of a man rather well known in bee-keeping circles as a writer and officer of an association which illustrates the errors sometimes made. The state apiary inspector visited his apiary and found him in the proud possession of about thirty colonies with plenty of disease. These colonies were so constantly under the watchful eye of their owner that in his walks about the grounds he had worn paths around each colony. He also had a so-called out-apiary where all the colonies were dead of disease except five. After the yard had been duly examined and the owner urged to clean up, as he well knew how to do, the inspector was accompanied down the road by his friend the bee-keeper until they finally reached the crossing of two fine gravel roads. Here the bee-keeper stopped and delivered himself of a discourse which may be abbreviated somewhat as follows: "I have an excellent location here and the roads are so fine that this would be a good place to run a series of out-apiaries. I could put three east of here, two west, two south and two north which with the home yard would be ten yards. Then if I had two good experienced men to do the work while I furnished the brains and the planning with an automobile to go from yard to yard I think I could put ten colonies in each yard and make a good thing out of it." He then turned to the inspector, who was allowed thirty days a year in which to care for his own bees without employing help, and asked—"By the way how many colonies have you now?" The answer which put an end to the aircastle discussion was "234."

Another story illustrates the other extreme, that of efficiency in essentials. Another of my acquaintances has a record which in brief is as follows. He began bee-keeping some years ago while he was engaged in teaching, this giving him his Saturdays and the summer vacation, which was at first six months and later on three months. His colonies were gradually increased in number until when he had about 250 in three apiaries he decided to give up teaching and join the ranks of professional bee-keepers. Just at this time an apiary inspection law was passed in his state and he was urged to take the position of inspector and after due deliberation and with much doubt he did. The inspector's salary was small and to continue to run his colonies in the few days' time which he could obtain made it necessary for him to systematize his work still more than when he taught. He kept this up for over two years and finally accepted another position which took him away from his bees most of the time. At present he runs his apiaries

for comb honey but never sees them until practically time to put on the supers and as soon as the crop is off he goes back to his regular work, not to see the colonies again until the following year. This may seem impossible but it is not, but it has necessitated still more system. This case illustrates what can be done when necessary.

In this case there is no stimulative feeding or spreading of the brood—two hive bodies with plenty of honey take the place of that. There is no manipulation to keep up breeding late in the fall—plenty of honey does that. In fact from the end of the crop to the beginning of the next an abundance of stores is made to take the place of the various odd jobs that the average bee-keeper usually thinks are necessary. And after all it is doubtful whether there is more honey consumed than would otherwise be the case so it is not an expensive procedure. The only questionable point is wintering for he might do better in his locality to winter in the cellar which is possibly undersirable unless one is right on the grounds constantly. The moral of the second tale is that system and honey will solve many of the problems of the bee-keeper. You may be quite sure that when this bee-keeper is in his yards no time is lost or he could not produce comb honey in three apiaries on a few weeks a year.

But this brings up another point. We continually hear much of professional bee-keeping and the desirability of the industry ultimately falling into the hands of the professionals. If anyone has a stronger belief in this idea than the speaker, let him come forward. It is time however that we find out what the right kind of a professional bee-keeper really is. The usual conception is that he is one who devotes his entire time to bee-keeping. Let me tell you of a couple of them. One in an adjoining state (of course not in New Jersey) is a young man who has been taught by his reading to believe in professional bee-keeping. He has an apiary of about 100 colonies in which he produces some honey, rears a rather large number of queens for sale and in the winter spends probably one day a week selling honey, mostly his own crop. He makes no effort to get any other work for that is not in harmony with his professional ideas. Another, a man of more mature years, in another adjoining state has a larger apiary and I believe an out-apiary but he prides himself that he is a professional honey producer only. He rears no queens for sale but a few years ago did come down from his ideals sufficiently to buy some honey for a jobbing house. And there are plenty more, not old men who have practically retired and who are entitled to a rest but young men and men in middle life who work with their bees (and work hard too) whenever bees can be handled but who do nothing else, chiefly on the ground that professional bee-keepers should not. A vigorous application of system would often enable them to do the essentials in a month and they could devote their energies to some profitable vocation or avocation. Professional bee-keeping must not be carried to the extreme in our definitions or we shall find that the professional ranks are largely made up of men too lazy to do anything else. The northern bee-keeper will, if he carefully analyzes the situation, find it well nigh impossible to devote his entire time to his bees and if they are taking all his time, or even all of it in the summer, there is reason to suspect that system would lead to greater efficiency and economy.

We want all the professional bee-keepers we can get if we interpret that term to apply to systematic well-informed and well-equipped men who get maximum returns from minimum labor and who keep as many colonies as their individual circumstances will permit. This in brief means the elimination of the non-essentials that form a barrier and the progress of the industry. It also may mean the elimination of the inefficient professional bee-keeper who is wasting time.

In much that has been said you may not find a direct connection with my text. However, a text has been defined as something to talk from and the word "from" is to be emphasized in the present case. If we knew all the details of the production of Doctor Miller's record crop of comb honey we should find system first and last, an equipment of knowledge, the elimination of non-essentials and the greatest emphasis on the two essentials named. Doctor Miller has reached that time of life when he can and should no longer carry the heavier burdens of his younger days. The healthy cheerful life that he lives is well known to all of us and were it not for this he could not, at eighty-four years of age, care for eighty-three colonies with seventy-two of which he broke the record. Nor with all his vigor and even with his wide knowledge of bees could he care for this crop without a vigorous elimination of those things which retard practical bee-keeping, the non-essentials.

Mr. E. G. Carr, of New Jersey, the State Inspector of Apiaries was introduced and addressed the convention. He said in part: Education is the best way of eradicating Foul Brood diseases. We are largely working that way. We have not used the club on any one. During the last two years we inspected 5,000 colonies, one-fifth infected with American Foul Brood and more with European Foul Brood. The disease covers twenty of the twenty-one counties. Our annual appropriation is $2,000.

The committe of nominations reported the following officers which were duly elected: President, Dr. H. A. Surface; 1st vice-pres., Hon. E. A. Weimer; 2d vice-pres., Mrs. Dr. L. M. Weaver; 3d vice-pres., R. L. Coons; sec.-treas., H. C. Klinger. Members of Agricultural Federation, E. A. Weimer, H. A. Surface, H. C. Klinger. Member of State Board of Agriculture, E. A. Weimer. Delegate to National Convention, H. A. Surface, alternate F. G. Fox.

A motion was adopted inviting the National Association to Philadelphia. Another motion was made to hold the summer meeting in Ridgway followed by a motion to hold the next annual winter meeting in Harrisburg.

Afternoon Session.

The meeting was called to order by the President at 1:45.

A resolution was offered by J. S. Burkhart of Altoona that the Association ask the Legislature for an appropriation of $10,000 for bee inspection. The motion was carried.

The Committee on Resolutions then made the following report:

To the Pennsylvania State Bee-Keepers Association in our tenth annual convention assembled, in the State Capitol building at Harrisburg, Pa., on February 20 and 21, 1914, beg leave through our Resolution Committee to make the following report:

First. That we tender our thanks to the Department of Public Grounds and Buildings for the use of the House Caucus room for holding our sessions.

Second. That we thank *The American Bee Journal* for the gift of the Convention Badges to the members of our Association.

Third. That we express our appreciation of the untiring efforts of the officers retired and continued.

Fourth. That a copy be sent to the daily papers for publication and a copy be spread on the minutes.

Respectfully submitted,

John O. Buseman,
L. B. Huber,
H. K. Beard.
Committee.

John O. Buseman next spoke on "Treating Foul Brood in the Fall."

Treating Foul Brood in the Fall.

I bring up this subject of Treating Foul Brood in the Fall for discussion on the work I have done for the past few years. I treated in the following manner: if in the fall I found any colonies affected with Foul Brood I wait until all brood rearing is over, this being in the early part of November, then I take a clean hive with six frames of healthy honey saved from a clean colony in the honey flow and fill in with full sheets of foundation. I then set this on the old stand and brush the infected bees over the frames. The old frames are destroyed after I extract the honey.

But suppose a bee-keeper's bees are all diseased and he had no healthy honey to treat with.

This season I tried the following plan as an experiment: on November 7, 1913, I shook two colonies into empty hives with full sheets of heavy foundation in the frames. I then placed six pounds of cube sugar over the frames of each, over the sugar I placed a sheet of oilcloth so it extended over the edge of the hive. Over this I placed an empty super filled with newspaper for packing and wrapped the out side with tar paper, leaving a three-eighth inch entrance.

On December 7th I visited my bees and found one had absconded, but the other had drawn out fully half of the three middle frames, and seemed to be in fine condition.

On January 30th I again visited them, it being a warm day registering sixty-six degrees in the shade.

The center comb had a patch of eggs which had been laid in the last two days. I put a little pea flour on their entrance board and found them taking it in a little while.

If this artificial pollen is nutritious to the larvæ they will rear this brood but if not they will have to wait until natural pollen can be found. I feel sure this will be a positive cure for Foul Brood.

A paper on "Bee-Keeping in Porto Rico," by Penn G. Snyder of Aibonito, Porto Rico was read by the Secretary.

Bee-Keeping in Porto Rico.

Penn G. Snyder, Aibonito, P. R.

Friends and Members of the Pennsylvania State Bee-Keepers' Association:

Our worthy secretary has requested me to give a paper on bee-keeping in Porto Rico.

Unfortunatly I do not know much about the business of keeping bees in the tropics.

Conditions—Locality (especially locality is a good peg to rest on) bees and in fact everything is different from our northern conditions.

The Porto Rican bees are the only living native born life from insects to animals including man that has any get up and go in them, and strange to state the Porto Rican bee usually causes you to get up and go too.

Most of you know I've handled many hundreds of hives of bees in my work among them in the past fourteen or fifteen years, and many of you know I seldom use veil and have never been guilty of using gloves.

Well, its all changed—gloves are a necessity, and I sometimes feel I would like to have one of Cogshall's bee proof suits.

When the Porto Rican bees are hunting trouble they usually find it and they seem to always carry a chip on their shoulders which is perpetually falling off.

I have some fifty nuclei and they are the meanest bunch collectively I have ever come across.

Believe me they are hot stuff.

I know it because I am hot under the collar from the time I start working with them until I am through.

What I do not know of bees and conditions down here would fill many volumes, and my discovered facts are few.

One thing I have learned—the picture we form in our minds when we say tropics is frequently all wrong.

While you were shivering up in Pennsylvania the people in the vicinity of Aibonito shiver at night.

One night the temperature dropped to forty-one and one-half degrees F. Fifty to fifty-five is normal at this time of the year.

We must remember this is in a country where the best of houses are but summer cottages, and the native huts of the country are little better than the habitations built by the uncivilized negro in the wilds of Africa.

At present the days are one grand delightful cool summer holiday—shirt sleeves—glorious shirt sleeves—bright tropical foliage. Banana trees—cocoanut palms and royal palm the most stately palm of them all.

Sugar cane—deep green shady groves of coffee shaded by guma trees, orange trees and pineapples—but if you should ask me I would give them all; bananas, oranges, grapefruit and cocoanuts for one good peach tree in bearing; wow!

No fruit trees of the temperate zone will thrive and produce fruit down here, so when you leave the coast towns it is good by to all our home fruits.

Strawberries are grown in the vicinity of Humacao which is about two days' trip away on horse back from Aibonito so I do not see many of these.

There are no other northern berries to the best of my knowledge.

I am afraid I am wandering away from my subject but I guess it will be interesting at any rate.

I will give another touch of local color and then try and get back to my subject of bees.

Picture to yourselves a meat shop—a monopoly—the only one in a town of about 11,000 inhabitants.

We see in mind, a number of rosy cheeked men in white, behind big blocks, waiting our orders, while behind them the wall is lined with beef, mutton, lamb, pork and veal, to say nothing of the fine juicy cuts of meat stored in the ice box.

We will now look upon the reality.

The picture will not look so good to our Northern eyes, or give one an aroma of sweet juicy meats roasting or broiling.

Well, you go in the door of a stone building, the windows are screened—the room is divided in half by a wooden partition about four feet high, the remainder to the ceiling is wired so the whole place is fly proof at any rate.

Over a small hinged screen window is a cracked slate on which is written beef meat, so much a pound.

We tell the attendant we wish a pound or more of the beef.

Meanwhile, we are looking in to see what we can see.

It is not much our eyes behold—the remaining unsold parts of one-half an old cow or bull. Remember this is the whole meat supply for one day for a town of 11,000 people.

There is no ice box, no ice.

The meat is hacked off as it is purchased; there are no cuts, you take it as it comes.

No mutton, no lamb, no pork and no veal.

Steaks are unknown; would be too tough to eat if you could purchase them. Don't like the picture.

To get back to our friends the bees. (I beg to change that—the Porto Rican bees are no friends of mine.)

Have had samples of honey from different parts of the island, and they are not like mother used to serve.

The flavors are rank, the honey is mostly dark and of a very poor body.

One cause is undoubtedly the heavy percentage of humidity which is constantly in the air, this makes it difficult for the bees to dry the honey to as thick a body as we expect in the states.

Another cause may be the bee-keeper does not allow the honey to ripen sufficiently before extracting.

There seems to be more or less honey gathered every day and it may be the bees do not have sufficient room and for that reason they would be compelled to store the freshly gathered honey with the capped providing there were any open cells.

This would mean very thin honey in some of the cells if the honey was extracted previous to the time when all the cells were capped.

When looking at the map of Porto Rico the island seems to be a very small place, but appearances are sometimes deceiving.

The island is an assemblage of hills, dropped haphazard as Dame Nature saw fit to place them.

The hills and valleys are covered in most instances by tropical vegetation and trees of a rich deep green.

To my eye, the island, would support many times its present population which is quite dense; being 310 persons to the square mile.

Japan can boast of but 311, China 266, Germany 280, United Kingdom, the state of Jersey, U. S. 337, and so on.

Some of the hills are upward of 3,700 feet above sea level, so taken all in all Porto Rico is quite some place, and if laid flat, would cover quite a little bit of ground.

The native bees—or rather the semi-wild bees of the island are great swarmers.

Have taken several bee trees and in no instance has there been more than four Hoffman frames of comb in the cavity, be it large or small.

When they reach this strength they must deem it time to swarm and for this reason they seldom grow larger.

It may be of some interest to you if I should describe the taking of one of the bee trees.

The expedition was quite numerous, I the only beeman in the company.

As we started off on horse back there was first a pupil of mine in bee-culture, the amateur, (a man of fifty carrying an open umbrella as a sun shade), next his secretary, then one—a government entomologist, one audience and lastly a peon to do the heavy work.

Oh this was taking a bee-tree de lux!

We were mounted on spirited native horses which seldom weigh over six or seven hundred pounds, they are as hard as nails and as sure-footed as goats.

The peon carried in hampers or saddle baskets two swarm boxes, an axe machete, a knife and a ball of string to say nothing of the smoker.

Our cavalcade started about 9 a. m.

We rode for over two hours over the most beautiful of wooded hills, all bathed in the bright tropical sunlight.

The many clouds would frequently darken or shade a hill top or valley giving wonderful contrasts of coloring.

Our highest point was reached about 10 o'clock, (it is very near Aibonito), this spot was made use of by the Spanish soldiers in gone-by-days as a wig-wag station.

From this point San Juan at the North, and Ponce on the South coast can be seen with the aid of field glasses, a distance of eighty-two miles by road.

We started out on a fine clay road which later became a rough lane full of holes and gullies sometimes two feet in depth or in width.

This lane later degenerated into a mere track or path which was more rough and difficult to travel over.

It was lucky the horses were sure-footed as we had rocky gullies three to six feet in depth first on one side and then on the other and frequently on both sides of us.

After fording several streams and an hour's travel such as the last we reached our tree which was a guava.

I, as the chief high-priest of the art of bee-keeping inspected the tree and finding the entrance was close to the ground I opened fire with the smoker until the inhabitants of the citadel were driven from the defenses and were all imbibing sweets in case of necessity.

I then ordered the attack to begin and while we sat near by and gave orders; the peon did the laborious work of chopping an entrance large enough to remove the combs.

When the opening was sufficiently large I began operations on the comb, and the bees, pardon (my friends the enemy, I am in a very polite country) were docile enough at this stage.

I secured four and one-half Hoffman frames of worker comb and about one frame of drone which was discarded. This is the largest swarm I have so far seen.

There was little or no honey, about two inches in the top of one comb that was all.

All the damage inflicted was on me; several stings, not many.

The stings were merely a reminder to me of the fact that bees carry stings and partly went to show the ability of the high-priest of the occasion.

Somebody must praise me and as the Bible tells us not to hide our lights under a bushel I am only complying with the transcript of the Book of Faith.

We rode home with empty tummies and the dinner waiting us was more than acceptable, in fact it was necessary.

The peon brought the bees in due time which were put into a ten-frame hive and they have up to date lived there happily.

Trusting I have not bored you and that I have not over stepped my time I thank you.

PENN G. SNYDER.

Aibonito, Porto Rico.

The next subject was "House Apiaries," by F. J. Strittmatter, of Ebensburg, one of the state's greatest honey producers and perhaps the largest house apiarist in the United States.

House Apiaries.

F. J. Strittmatter.

To the President and Brother Members of the Pennsylvania State Bee-Keepers' Association:

The Subject of House Apiaries is one to which I have given a great deal of thought for the last five years or more. We built our first House Apiary, March, 1910, at an out-yard near Ebensburg, Pa., and put the bees in it the same spring, starting at about the same time a regular out-yard using Root ten-frame chaff hives at this latter yard near Carrolltown.

The first three seasons the bees in the house apiary always came out a little ahead besides the bees were much nicer to handle and we were more independent of weather so far as our work was concerned. This house apiary is 14 x 28 feet, two stories having seventy-five factory hives placed in same, and costing about $400 besides hives.

In the latter part of the third season or 1912 we decided to get all our bees into house apiaries as soon as we could and proceeded to build a combined house apiary and garage at our home place. We got this building completed and the bees moved in about the first of October. This building is 20 x 30 feet, three stories the lower being dug into the ground in side hill and used for garage while in the upper two stories we have built in eighty-six hives. This building cost complete including hives built in about $600 and we found we were able to make it *much more convenient* to handle the bees in this one than by our first arrangement of using factory hives inside the building.

In 1913 we proceeded to build our third house apiary which is built after the same general plan as the one at our home yard only it is but two stories and for bees only. This building is 12 x 24 feet, two stories containing sixty-two hives built in solid and cost about $300.

In all of these house apiaries we have ample room for supplies in same building and we can have them very much handier than by any other system I ever saw besides having everything in the dry and safe from thieves and meddlesome boys, but one of the greatest advantages is that I can work right on most any kind of weather in season and there is practically no stinging inside the building even when no honey is coming in, I seldom need veil or smoker, and no amount of opening hives and manipulating will tend to cause robbing as no bees from other colonies know anything about the hives being open. No bees can get into the building anywhere except through their entrance direct to their hive except bees from such hives as are opened by the operator.

We have all hives which are built into these buildings arranged with about four inches of sawdust or other packing material around the bees.

Our hives are all the regular ten-frame size using the same frames we had in our chaff hives and we also use the same supers which we used outside.

By cutting small corners out of all window panes any bees getting into the building from hives opened can get out very readily and by means of screens and home made bee escapes on the outside we have made it so that they do not get back into the building this way.

The first house apiary which we built was built of boards covered on all sides and roof with a good grade of valley tin, and the hives in the inside are arranged in pairs with room between the pairs to work and the front end of hive placed up to the side of building with entrance cut out through. But the latter two are built of studding placed twenty-four inches from center to center and weatherboarded on the outside after having two plies of good building paper tacked on the studding one ply, the ply next the weatherboarding is tar paper.

The hives are built with one hive to each space between the studding and as our supers measure about twenty inches outside measure this allows about four inches in the clear between supers when same are on the hives. We find this is ample room for handling same.

Our first house apiary has proved very satisfactory, in fact more so than we expected but our later ones we like much better.

As to cost we consider it as cheap or cheaper in the end to build house apiaries, provided you can buy the ground reasonable, as to keep bees outside in chaff hives and single walled hives do not prove satisfactory unless protected liberally for winter in our locality.

As the pictures show we have an alighting board as well as a roof board to

protect the entrances and give the bees better chance to fly into hives, and same are painted different colors to help the bees to locate their respective hives.

In these house apiaries we invariably find the bees all to come through the winter with hives dry and free from mold in the spring while we have considerable trouble in this line with our hives outside.

One important thing is to make everything mouse-proof, and to have plenty of windows of ample size so as to have good light.

I might say that the main reason the third house apiary cost us less than the first one is that we learned how not only to make it better but we were able to make much better time in the work of building and had a little better help. We did not, however, hire any carpenter at this building but had a good all around handy man whom I had help most of the time and who was more careful to do things as I told him than any carpenter I ever hired.

It will be noticed that in our latter two house apiaries the hives are arranged with the side to the wall and the entrance consequently on the side of the hive giving a much more convenient arrangement to handle the bees, and the hives being solid if you wished to hive a swarm by the returning plan you could remove the frames to another hive and place empty frames in their stead and cover up and you accomplish the same thing as by moving the hive. However we did not have a swarm last season which makes me think that the house apiary is a big improvement in this line.

F. J. STRITTMATTER.

Ebensburg, Pa., R. D. 1.

After the reading of his paper a number of questions were asked:

Do you find a house apiary more convenient than an out door apiary? Much more.

How about the swarming? Do not have any.

If in handling bees how do you get them out of the house? Have a small corner cut out of the panes through which they escape.

Are bees more gentle? Yes. Cross bees soon go to a window and get outside. I work a whole day some times without a smoker.

Is there a difference in the work done by bees on the north side of the building and those on the south side? No difference noticeable.

Dr. Surface concluded the program with the subject, "Soil Fertility and Honey Production."

Soil Fertility and Honey Production.

Dr. H. A. Surface, Harrisburg, Pa.

It is generally agreed that we cannot afford to plant for nectar or honey-production alone. In other words, to sow a field of any kind of crop merely for the sake of the honey it might produce is scarcely profitable. If, however, the field crop can be made a successful primary feature, the factor of honey-production as a secondary feature may be entirely clear gain, as most profits come from comparatively small things. We note, for example, that the packing houses of Chicago utilize absolutely every part and by-product of the hog excepting the squeal, and it is now proposed that they shall utilize that in making phonographic records to aid the old style noisy bee-keepers in making more noise to help hive their bees.

In this day of keen agricultural competition every factor possible should aid the husbandman. Natural conditions are against success from continued cropping or from the old style farm methods. It becomes necessary to keep up with the times by adopting such new methods as the scientific experts show are beneficial. It is impossible for any husbandman to succeed without considering as an entire unit all the factors that enter into modern agriculture. I mean to say, he may be up-to-date in many things, but if not in all, he may fail. For example, he may select seed in accordance with the methods of Holden or Hunt; he may fertilize in accordance with the latest directions from Hopkins or Thorne, and may cultivate according to Hilgarde, and spray according to Gillette, Forbes or to Howard, but when the crop returns are to be sought he must see the "handwriting on the wall" or hear the saddening statement that was made to the rich young man who went

to Christ, "One thing thou lackest." This is organic matter with soil fertility. We cannot afford to buy much commercial fertilizer, as to depend upon it entirely, year after year, as a sole source of plant fertility, will eventually make a rich man poor. We do not have enough barnyard manure to meet the needs of our extensive agriculturists or horticulturists. *How,* then, can a poor man increase his yield by economical means? This is a question of such far-reaching importance as to justify our attention for a few minutes, even though at first it may be beyond anything pertaining to bee-keeping, and apparently inappropriate before this assembly.

Let us remember that the greatest element of plant food is that which is commonly called "nitrogen." It is by all means the most expensive element in our commercial fertilizers, and the most difficult to get into the soil by artificial means. At the same time, it is the most abundant element in the atmosphere. Practically eleven pounds of this material rests upon each square inch of the earth's surface. Why is it not directly utilized? It is because it must be made over or transformed into the kind of compound that can be taken up by plants. An illustration is to be seen in the lowly field bean. In its raw state it will scarcely sustain human life, but let it be properly cooked and there is no more nourishing article of food for mankind. Thus, when the nitrogen in the atmosphere is transformed it becomes at once the most stimulating or invigorating element in the food of plants.

How is this transformation effected? Here is the important point of our story. This is done in nature's laboratory by myriads of organisms known as bacteria, that live in a mutually beneficial relationship, known as symbosis, upon the roots of the Legume plants. There are the members of the Pulse or Pea and Bean Family, botanically known as Leguminoseæ. Upon the roots of all members of this family these beneficial bacteria nitrogen gathering and transforming nitrogen live in great numbers, forming little lumps or nodules. Upon practically each kind there is a different species of bacterium, as is shown by the fact that the nodules taken from the roots of different kinds of legume plants differ in size, shape, color and general appearance. These nodules or lumps are large enough to be seen readily by the unaided eye. Take up, for example, the roots of the common white clover, sweet white clover, the red clover, crimson clover, alfalfa, the locust tree, and the red bud tree, keeping the surrounding earth with them until they are placed in water, and very gently wash, to avoid breaking off their most minute fibres. Note the small white, pinkish or brownish lumps that are there to be seen. These are the nodules which are homes of myriads of bacteria, which are plainly seen when any lump is crushed under a compound microscope of high power. Not only are such lumps the homes of bacteria, but they are composed almost entirely of available nitrogen, transformed from the unavailable nitrogen of the atmosphere by the vital action of these microscopical organisms, and thus rendered fit for immediate use by the plants upon which they grow, as well as by other plants that may be grown in the same soil. Therefore, it can be seen that the more of such legume plants that are grown in any soil, the more fertile will the soil become from the standpoint of increase of nitrogen and organic material therefrom.

As the plants mature they draw upon the nitrogen stored in the nodules on their rootlets, using part of it in formation of tissue, especially seeds.

A bulletin just at hand, No. 145, from the Agricultural Experiment Station at Brookings, S. D., says, "Every ton of clover hay takes forty pounds of nitrogen from the air, and every ton of alfalfa takes fifty pounds from the air through the roots of these plants." Hence, by growing these crops, or other legume crops, and returning them to the soil, either directly or after they have been transformed into manure, a supply of nitrogen in the soil may be maintained, provided, of course, that sufficient amounts of legumes are grown.

So much for the primary story of increasing soil fertility, which is really more important than increasing the size of the farm. Now there is a secondary point for consideration, which, for us as bee-keepers, is of no small importance. This is the fact that among the very best honey producing plants of the world are the legumes. In connection with crimson clover and locust blossoms in the spring we have a close succession of alsike, white clover, sweet yellow clover, alfalfa, and sweet white clover, all of which the honey bees work on to a very remarkable extent. Every one of these legumes here mentioned is of very great benefit as a soil renewer, and at the same time they are recognized as being the chief honey-producing plants of America, with but few exceptions.

Another important point of the story is that in addition to being soil renewers and nectar yielders, they are our greatest forage plants. No other plants contain as much protein or are as beneficial as feed for live stock. The energy of the work horse and the yield of milk from dairy cattle increase when these plants are used

either as pasture or hay. The growth of pork is greater when these plants supplement the grain feeds. The production of eggs is increased by their proper use in the poultry yard; and, in fact, there is a report of a banquet of Western Growers in which one of these plants (alfalfa) furnished not only bread and vegetable food, but also a food used as breakfast cereal.

To get the benefits of such plant growth for the bee-keepers it is necessary that they should bloom and the bees have opportunity to visit the blossoms. This means they should grow at least until the blossoms are commencing to fade or wither. It is known that the heaviest nectar secretion is just at the time of the opening of the bloom. After a flower has been visited by a bee and fertilized the secretion of nectar stops, and the blossom fades and drops. Here again good agricultural practice is in accordance with apiculture profits. It so happens that the best results for hay or stock food are obtained by cutting just before the seeds form, which is just after the blossoms have passed their stage of perfection and are withering. Also, when these crops are to be turned down for soiling crops the best results are obtained by plowing them down when they reach this same stage of perfection or development. To plow down a green crop before blooming means to put into the ground too much water in the form of thin sap and it is supposed there is special danger of souring the soil there. The juice in a plant commences to become thick and sticky after it has passed the important vital period of full bloom. That is when it can be turned down with safety, and is also the time when it has done its greatest work in transforming and fixing nitrogen, but let it be remembered that the fertility is not lost by using the plant as stock food. If the manures, liquid and solid, are saved and returned to the field it will have as great fertilizing value as though it had been plowed down, and the grower will have the increased benefit of its feeding value for his live stock.

From the further standpoint of the greatest fertility from the nitrogenous nodules, it must be remembered that their best stage of perfection is reached when the plant also is at its highest point of development or just at the end of blossoming and the beginning of the ripening of the seed. Thus whether the plants be plowed down, or cut for the silo, or dried as hay, the best results for honey production, for soil fertility, and for animal food are to be obtained by letting them reach a fair stage of development or perfection rather than cutting, as is the fault of so many husbandmen, before the blossoms open.

It, therefore, becomes important for everyone interested in the tilling of the soil to see that a definite effort is made to plant legume crops at every opportunity. They can be used as filler crops at the time of year when nothing else is grown, as, for example, by sowing crimson clover just before the last time the cultivator is run through the corn field, and growing a sod until the next spring. Last year the writer sowed eight quarts of crimson clover seed and one-half pint of cowhorn turnip seed to the acre in a corn field, and after the corn was harvested he removed tons of the best turnips for cow food and table use, and at the present time has a good clover sod on what would be otherwise a barren stubble. The time has come when it must be regarded as slothful for a man to leave his soil without a clover crop as we formerly regarded it for a careless person to leave his implements exposed in the field during the winter. From this crimson clover sod, next May will spring a wealth of scarlet bloom, looking like a field covered with ripening strawberries, and humming with the busy bees in the swarming season.

It must be remembered that the legumes are averse to thriving in acid soils. The soil wherein they are to grow should be sweetened by the use of at least one ton of lime, or one or two tons of finely ground limestone per acre before seeding. In the case of the corn, this can be done by spreading the lime broadcast just before planting in the spring.

Soil inoculation is one other important point in order to be sure of an abundant growth of the soil bacteria and nitrifying nodules, and, consequently, the legume growth. This can be effected best by sowing broadcast two or three hundred pounds per acre of soil taken from a field which has previously grown the legume crop that is to be planted. Another means of inoculation is to sow the crop and let it reach fair maturity, or even go to seed again on the same soil. Then turn it down and seed again. After two or three repeated efforts on soil where lime has been used to prevent acidity, there will be an inoculation which will result in a good growth in the future. A third proposed means of inoculation is through commercial cultures prepared by different commercial concerns, and sent by mail. This is the most expensive and least satisfactory means of inoculation. As a rule, we do not recommend it. The best means of inoculation is by sowing soil

from the field that has grown the crop desired. Apply it in the evening or on a cloudy day just before sowing seed, and harrow in both soil and seed.

While, as a rule, each legume has its own kind of bacterium, yet there are exceptions, as, for example, in growing sweet white clover to produce the inoculation for alfalfa, as in this case the bacterium is the same. It is to be further remembered that the legumes have their own proper or best respective seasons for seeding, and the one to plant at any time of year depends upon the time of year when the ground is available for said planting. For example, we sow red clover and alsike in our grain fields in February when the ground is honeycombed with frost. Just as early as the soil can be worked in the spring we sow Canada field peas, with or without oats. A few years ago in our own fields we drilled Canada field peas, oats, red clover and alsike, and had a good stand of the three legumes on the soil so that as the peas and oats were cut the clover field remained. Later in the spring, and just after corn planting, is the proper time for planting cow peas, soy beans, and field beans or soup beans. In midsummer is the best time for sowing crimson clover, and in the early part of August is the proper period for seeding with alfalfa. Later in August, or early in September, we sow hairy or winter vetch, either with or without rye, but prefer one peck of vetch and two or three pecks of rye to the acre to give one of the best crops that can be used for a winter cover crop renewing soil fertility, and also keeping the bees busily and profitably engaged.

In conclusion, let me say that the man who learns how to use one or more legume crops in each crop rotation, and keeps the legumes always on his ground as cover crops, will have honey in his hives and money in his bank.

A short discussion on pure food laws bearing on the sale of honey followed.

After a motion was made that the President appoint a committee of publicity the convention adjourned.

H. C. KLINGER, *Secretary.*

Report of the Eleventh Annual Convention, Harrisburg, Pa., February 23-24, 1915.

The meeting was held in the House Caucus Room, Capitol Building, and was called at 7:30 P. M., by President Dr. H. A. Surface. Prayer was offered by G. H. Rea. The roll was called with thirty members present, and the minutes read and adopted.

Dr. Surface delivered the annual address. He spoken of the welfare of bee-keepers in Pennsylvania. The Pennsylvania State Bee-Keepers' Association has accomplished a great work. Pennsylvania has the most ideal bee law in the Union and this was obtained through this organization. It stands for the protection of its members and for securing legislation toward this end. It is the largest Association of its kind in the United States. He spoke of the first attempt the Association made toward securing the passage of a bee law and how it was ridiculed in the Legislature. Now public sentiment is better educated.

Never has an appropriation of $500 a year gone as far as that which is spent on bee inspection work.

The diseases of Foul Brood have been more destructive in Pennsylvania than the Foot and Mouth disease, yet the State has appropriated hundreds of thousands of dollars to pay for the stock killed while the bees killed in inspection work are not paid for. This is unjust. The procedure of stopping the Foot and Mouth disease is a destructive policy while the inspection work among bees is a constructive policy.

He also spoke of the net-weight law as effecting bee-keepers. Bees do not carry scales with them to weigh the honey hence the variations in weight of sections. The result of the law will be that more work will be required to put the honey on the market and consequently more must be charged for it.

This is the cost of reckless legislation—it adds to the high cost of living.

A paper from Penn G. Snyder, of Aibonito, Porto Rico, on "Bee-Keeping in Porto Rico," was then read.

Bee-Keeping in Porto Rico.

As distance lends enchantment, possibly my present environment may cause my hearers to long for a warmer and greener clime than that which you are experiencing at the present time. Here all is green, the trees always in leaf and never real cold. While writing, the busy contented hum of the bees sound like music in my ears. For one thing in Porto Rico we do not have a winter problem. The bees can fly every day in the year, providing it is not raining, and believe me, it does RAIN here in capitals. Also, the gentle balmy breeze is often like a roaring lion, and the bees have a hard struggle to hold their own much less make headway against it. Frequently the air to the leeward side of the combined house and workshop will be filled with home-coming bees awaiting a lull in the wind to dart to their homes.

If we do not have winter problems we have others which make us do some work and quite a little guessing. For instance, it is unlawful in Porto Rico to kill

birds. The native kingbird seems to simply adore virgins. Also we have all kinds, sorts, sizes and conditions of lizards which eat bees and no doubt virgins. The virgins may easily be caught when they drop to the ground in the act of copulation, while on their wedding flight. Naturally this means a hive or nucleus is without a mated queen which as you know is a very necessary thing to have in all successful bee communities. I have a record of one nucleus which lost ten (10) virgins in succession, the eleventh (11) virgin succeeded in reaching home safely. This nucleus was stocked with hatching workers three (3) times to keep it strong. Fortunately this is not the average, or bee-keeping in Porto Rico would not amount to much.

In my LOCALITY, also with capitals, you can count on it if a hive becomes queenless, fifty times out of one hundred the hive will remain so until you introduce a laying queen. Speaking of introducing, I have a queenless hive I wish I could loan Arthur Miller for a week so he could dispose of a few laying queens by his smoke method of introduction. I have lost five (5) tested queens so far in this one hive introduced by smoke. Up to date nine (9) out of ten (10) laying queens have been accepted by the smoke method; it is an easy and rapid method and the queen is on the job at once if at all.

In my locality we have two (2) crops a year and in between times there is more or less honey gathered, enough to keep brood rearing and sometimes a little is stored. As to yields I cannot make a statement, as my work so far has been mainly increase. When the next flow comes late in March I hope to receive a fair yield. Am sending a sample of honey which I trust will be passed around—you will no doubt note it is not nearly as good as is produced in our Eastern States—it is not like mother used to serve. The New York quotations on West Indian honey is from forty cents a gallon up, so you can see there is not a fortune in honey at the above minimum price.

The greater bulk of honey is gathered from the trees; there are many which yield nectar in abundance, a few of which are guama, guava, coffee, orange, lemon, grapefruit, aguacate royal palm, and century plant, which is not a tree but whose blossom is as high as the average trees here. There are quite a few wild bees, blacks predominating, with a few hybrids. The natives wait until after the spring flow and then clean them out, but as they seldom build more comb than the equivalent of four (4) Hoffman frames of comb before swarming, there is rarely much honey secured.

I am informed that when it was learned I was to keep bees for a living in my present location, my native neighbors smole a smile behind their hands at the fool Americana. It is to be hoped it will be my turn to smile in the near future.

If my memory does not mislead me you had a description at one of your late meetings of my unpleasant welcome and experiences with the none too gentle native bee. There would have been little contrast if my bees back in the states were some of Dr. C. C. Miller's old black hybrids, but when I contrasted the gentle Swarthmore Goldens with what I had here, I sure cast longing eyes at the few tested queens remaining which I had escorted to my present locality.

Bee-keeping in Porto Rico was beginning to assume quite sizeable proportions until checked by the European war. It is to be hoped E. R. Root's editorial in December 15, '04 *Gleanings* will be fulfilled. Boiled down the article states the baking companies will ultimately use all the cheap and poorer grades of honey. "It is a consummation devotedly to be wished."

One thing is cheap in Porto Rico Fifty cents will be accepted for ten (10) hours' work for a man, but, and it is a very large *but*, you must remember this is a country of mañana, and if the work is not done to-day, there is always to-morrow or next day, so why hurry. They tell me I will get the "no hurry" habit if I remain here long enough. Fortunately this remains to be proven.

PENN G. SNYDER.

The rest of the evening was taken up in discussions.

Morning Session.

The meeting was called at 9:15 by the President.

The report of the Secretary-Treasurer then followed:

RECEIPTS.

Balance on hand,	$26 34	
Membership Dues,	72 50	
One Report sold,	55	
Total receipts,		$99 39

EXPENDITURES.

Secretary's Expenses to Harrisburg Meeting,	$5 67	
Printing 200 Receipt Cards,	3 35	
Dues to Agri-Federation,	5 00	
Subscriptions to *Review*,	6 00	
Printing Programs, Harrisburg Meeting,	4 00	
Stamps and Postage,	5 00	
Envelopes,	40	
Total Expenditures,		$29 42
Balance on hand,		$69 97

A member reported having trouble with a commission house on a sale of honey. Thereupon a resolution was adopted "That this convention authorize our President and Secretary to act for us as a committee to settle disputes and make adjustments between members and commission men with whom they may deal, and that notice of this action be given our members."

The Secretary-Treasurer's, report was adopted and the chair appointed Messrs. Shope, Huber and Dr. Herman to audit the accounts.

A paper was then read by the Secretary on "Increase and a Crop of Honey" from Geo. M. Steele.

Increase and a Crop of Honey.

President Dr. H. A. Surface and assembled bee-keepers, there seems to be something wrong with my subject, as I am only a little fellow and such a wide field to talk on that I must take it for granted you all and those responsible for my subject that you are aware of my shortcomings, "Lots of Talks."

Increase: Well, to increase we must have lots of bees in our hives and to get the best and quickest results and save our honey crop at the same time I advocate to make all increase after June 25th to September 1st. Now to illustrate my one of many ways I will relate a story of a customer of mine that purchased a strong three-frame nucleus August 25th. She took it home to Bordentown, N. J., placed same in an eight-frame hive body with full sheets foundation with a feeder at the rear of hive, and fed same three times daily for three weeks, then placed an empty hive body under first one, moving two frames of hatching bees down into lower body and fed twice daily until late in October. On or about April 25th she wired me her bees were swarming. I went to see her at once. Well, she had bees sure. She said she did not care for honey as much as bees, as she wanted them for her large apple orchard some four miles away and to make increase for her. She had ten empty hives complete and in looking over her bees I found several queen cells and her queen. I proceeded as follows: Placed all hatching frames of brood in an empty body and that meant nearly all of them, and I left all open brood on old stand with a cell, the old queen I gave four frames of hatching brood and the balance I placed with the other queen cells, penning up the two new hives to keep all field bees there for 24 hours. All hives had feeders on and were fed until June 1st. About June 20th she split the two new hives as I did the first one and

they all stored 280 pounds surplus honey, and with one more split she went into winter quarters with 10 hives with bees in two bodies without raising or buying more queens at that time. Her outfit cost to July 1st of that year $42.00, and she sold $41.00 of honey and had the bees for the next season, and I believe she sold over $200.00 worth of honey the next year and has now some 27 colonies. The whole secret of increase is in the feeding at all times or as fast as bees will take care of it. I use one quart of granulated sugar to two quarts of water as late as August 15th, then I make it half and half or stronger as the weather gets colder. I believe it very unwise to increase and try to produce surplus honey at the same time as the bees must have large forces of bees in all states of ages and working forces. Have any of you assembled ever sat before a hive that was increasing as much as 15 pounds daily and thought what was going on in that hive? Well, there must be great activity there and forces to store and ripen the product, to build, feed guards and whatnot, numberless work to do. So don't increase and try for large surplus. The taking away of a frame or two will surely hurt that colony's storing capacity. When the bees have about finished the harvest then the hatching brood will be consumers, they are the ones to make work on and make increase with. The best feeder I have found is the Alexander, as it is at the back of the hive and robbers don't find the entrance so quickly. Now increase after crop is easy. Take all hatching brood away from colony in the evening and leave old queen on old stand, give increase new queens or hatching queen cells, feed as stated above, getting bees into two bodies when they need the room, as they winter better in two bodies in the open. All new lots of bees removed from parent colony should be penned up with grass or anything the bees can eat out of in 24 or more hours, closing entrance up so only two or three bees can get out at a time. This will keep robbing down.

A Crop of Honey: Well, last year all ways failed with the white clover with me here. The surest assurance of a crop is perfect wintering and as stated above with the nuclei lots of stores and bees made swarming possible in April; then is the time when bees are strong to add bodies and in fruit bloom the queens have ample room to lay in and bees have room to store honey. Then with lots of stores the brood rearing continues up to the main flow and if the man will watch the bees carefully and place empties as wanted they will be *step-ladder hives* when the harvest is over. It is always easy to say what to do but the conditions are never the same so what I have said will answer if all practice feeding which will keep queens laying much later in fall and all late hatched bees are the ones that make the spring work possible. I read sometime ago of a beeman who claimed that sugar was nothing more than dope, a little better than honey dew to winter bees on. That sugar furnished to the state of Wisconsin was bad dope sure. What do you all think? Bro. Rea will back sugar with me, I am sure. I believe I have stumbled on a cure of American foul brood in the combs and if it is sure will give it to those who have it to save their combs with. And if this formula will kill the disease in combs it can be fed to bees to check and possibly stop it in the larvæ state. I have some fifty badly diseased combs now that will go into treatment in a few days and will be placed on clean, healthy colonies in spring to watch developments. Hope I am on to it sure so as to wipe out this trouble of ours. I was clear of all disease on October 1st last, but will hope to be this spring too. Now see if some of you brothers can't place an embargo on honey from diseased countries coming here the way it does in leaky barrels, and the bees keep on getting it. I think most of our disease that has hit Philadelphia County and been sent broadcast from here was gotten through the honey imported here. I was on the docks some two years ago when a steamer was unloading and the bees nearly drove the stevedores away, and it was a leaking barrel of honey that caused the trouble. *Think it over and fight for some law on this point too.*

Well, I am with you all in thought and will wish all a good time, too. Yours,

Geo. M. Steele.

Some discussion followed this paper, as to whether bees during robbing will sting animals or people.

A. N. Coons then read a paper on "How many Colonies in an Apiary."

How Many Colonies Shall We Keep in an Apiary?

The question of how many bees there should be in an apiary to achieve best results, is one in which we are all interested, since it affects us in one of our most vulnerable points, our pocketbooks. Conditions vary so much in different seasons and localities, that each one must be the judge of their own locality, and vary the amount of their bees accordingly. A few bee-keepers keep a large number of colonies in one place, but in my opinion, to be successful, they should have a very exceptional locality and be specialists in their work. The number most suitable for the average bee-keeper, with standard appliances, seems to be from 75 to 150 colonies. The plan which I favor, at least for Potter County and vicinity, for those who make a specialty of bee-keeping, is to have a series of small apiaries, each of from 25 to 50 colonies, separated from each other by a distance of at least two miles. There are a number of advantages connected with this method of locating apiaries, several of which I will now mention.

There are a number of light flows during April and May, from soft and hard maple, dandelions, red cherries and various fruit trees, and we have found out that if the bees are in small bunches, they will improve very rapidly during these flows, and will be full of brood and honey, and in the best of condition to take care of the main honey flow early in June, while if there are 100 or more in one place, it is the exception rather than the rule, to have them in first-class condition, and honey that should be stored in the super, is used to fill the combs around the brood nest. Also if there is foul brood in the neighborhood, it is much easier to combat it in small apiaries than in large ones. During light to average honey flows, if your bees are in small bunches, they will make much better progress than if in larger lots, since they will cover several times the territory without having to fly any farther for their loads. This difference is more marked in stormy or threatening weather, for if the bees are compelled to fly very far for their loads, they will probably stay at home, and no progress will be made in the super. And with an almost unlimited supply of nectar, we have found that the above rule still holds good, and that bees in small bunches will fill their supers quicker, making a nicer and more salable quality of honey. There are two factors according to this plan with which one has to contend that they do not have to if kept in larger lots. First, the question of transportation. If you have enough bees to be able to afford it, a light motor truck will solve the problem nicely, or a horse and wagon will do if you can't afford something better. Secondly, the swarming problem. It would be impractical to keep a man at each apiary to take care of the swarms as they might issue, therefore we deem it best to shake swarms from the old colonies into our half depth hives as soon as their condition will permit it. By so doing we get more and nicer honey from the shook swarm than we would from the parent colony, even should it not attempt to swarm naturally, and the old colony will be ready to gather you a surplus during August and September from buckwheat and goldenrod. Should there be danger of swarming before they can be shaken, entrance guards may be used to prevent absconding. Our experience in the production of comb honey has demonstrated the fact that it is more profitable to us to keep bees in small lots, rather than in so-called full-sized apiaries.

A. N. Coons, *Coudersport, Pa.*

The following committees were then appointed:

Legislation: Rambo, Klinger, Greene, Coons, Buseman, Weaver.

Nomination: Rea, Cassell, DuBree.

Resolutions: Fox, Strittmatter, Hostetter.

A petition to the Governor was adopted and signed by all the members asking that Dr. Surface, the President of the Association be appointed to the office of Secretary of Agriculture.

On the question as to when a membership ceases a motion was adopted "That members be suspended when they have lapsed three years and that the secretary be authorized to send a circular letter tabulated by the President with a postal for return reply to such delinquents at the end of the second and not later than the third year.

Afternoon Session.

The meeting was called by the President and the nominating committee reported as follows:

President, Dr. H. A. Surface; 1st vice-pres., Hon. E. A. Weimer; 2d vice-pres., Chas. N. Greene; 3d vice-pres., F. J. Strittmatter; sec.-treas., H. C. Klinger. Agriculture Federation, E. A. Weimer, H. A. Surface and H. C. Klinger. Member State Board of Agriculture, E. A. Weimer. Delegate to National Convention H. A. Surface; alternate F. G. Fox. The report of the committee was adopted and the persons named were elected unanimously.

F. J. Fox then read a paper, "A Bee Destroyer."

A Bee Destroyer.

When we mention the subject of bee destroyers or enemies of our hived pets, the mind at once suggests ants, moths, mice, skunks or thieves. Each of us will naturally think of the enemy that has been troubling him most. True, we might mention the brood diseases which is the most destructive enemy of our favorite avocation or occupation. But I do not care to enter upon the subject of disease at this time.

Not infrequently do we read accounts of bee poisoning caused by some spiteful or ignorant orchardist, who sprays his fruit trees before the blossoms fall, and thereby not only kills his best allies, the bees, but greatly lessens his setting of fruit. I can understand why some over-anxious orchardist, short of help and overloaded with work is tempted to begin the spraying stunt too soon. But during the past summer while inspecting bees at a well reputed agricultural school, I received the surprise of my life when the learned Dr. W., who is at the head of the institution, confessed that he was not only ignorant of the fact that the bees were his best helpers in fruit growing, but that he hated them and took great delight in killing them by the thousands, through using arsenic poison when his orchards were in full bloom.

Astonishing as this may seem to you I can prove the above statement as well as the gist of the following conversation which took place.

Having known that there were bees at this institution for some time, one day the latter part of August I called at the school. After some inquiry I found Dr. W., who extended to me a very cordial greeting. When I made known my errand he said, "Yes, we have some bees on farm No. 6." Then calling a laborer, who was a student, from a nearby field, he directed him to show me to the apiary.

After overhauling the bees, on my return I again met the Doctor. He said, "Well, how are the bees?" "They are free from disease, but in very bad shape," was the reply.

"In what way?" asked Dr. W.

"They show a great lack of attention, some of the colonies are queenless, the combs are very crooked in others, some hives lack their full quota of frames, while on others the frames are crowded too close together. A few of the colonies are crowded for room and need sections boxes, so all in all they are in an awful mess. There is some showing of Italian blood among them, but they all class as hybrids blessed with more than a plenty of temper."

"Well," said Dr. W., "Do you know I am awfully glad that you came around to look after the bees, and I am especially glad that they are in such bad condition."

I nearly fainted to hear such words from one in Dr. W.'s position and immediately asked, "Why are you glad the bees are in poor condition when they are your best friends in fruit growing?"

"That's just it," he said; "they are not my friends but my worst enemies. I hate bees and never miss an opportunity to kill them. Why I kill them by the tens of thousands during fruit bloom."

"What!" I said, "is it possible that you can treat your most valuable assistants in this way, when without their aid in pollinating the blossoms you would have little or no fruit to sell; why they are your fruit makers."

"No," he said, "they are not my fruit makers; they are my fruit destroyers.

Last year they attacked my ripening peaches in such numbers and ate them out to such a degree that they all graded as seconds and I had no first-class fruit to sell.''

''Why do you allow your fruit to get dead ripe on the trees before you pick it?''

''I get a better price for it in the local market by letting it on the trees longer, as it develops a richer flavor.''

''While this is true, the bees cannot puncture your fruit as you suppose, but follow the work of other insects or birds and do feast on the ripe juice when there is no nectar for them to gather.''

''What are you trying to tell me? I have seen the bees puncture the fruit and suck it out before my eyes.''

''I beg your pardon for contradicting you, but the bees' jaws are of such a shape that it is impossible for them to cut the skin of any fruit. This has been repeatedly proven by exposing a dish of ripe fruit to the bees and puncturing part of it. In every instance the bees sucked out the punctured fruit and did not molest the perfect. Dr. Surface has proven this himself and it is true beyond a doubt.''

Then said Dr. W.: ''I do not know what punctures my fruit for the bees to suck out. Perhaps God Almighty comes down in the night and punctures it for the bees.''

''As I said before, we know the bees will feed on over-ripe fruit when they have nothing else to work upon. But the bees are not damaging your fruit at this time.''

''No, for some mysterious reason they are leaving the peaches alone this year.

''The reason to me is not strange as I noticed there is a light honey flow on to-day. Bees are the best pollinators we have and without their assistance your fruit crop would be very light indeed.''

''I am not so sure about that.''

''If this is not true, tell me why many of the largest and best orchardists are keeping bees just to pollinate their fruit blosoms. Others who do not have bees go to neighboring apiarists and get them to move bees within flying distance of their orchards. They realize that they get much better sets of fruit when they have bees to pollinate their blossoms. Have you Burbank's works?'' ''Yes.''

''Then read the chapter in volume three on letting the bees do their work.''

''Then, too, the cranberry growers in New Jersey are just waking up to the value of bees as pollinators. One grower says he has the best set of fruit near the apiary and as he moves farther and farther away the berries become fewer and fewer till he did not have half as many where there were no bees to pollinate the blossoms. One grower I know of has bees and gives all the honey they produce to an expert bee-keeper who has charge of the bees.''

''Well,'' said Dr. W., ''you are probably right, and the damage may be the result of other insect work or of birds. I confess I do not know anything about the subject and it is a pleasure to meet an enthusiastic bee-keeper.''

''Do you teach apiculture in connection with your agricultural course?''

''No, that is something we have not done. When Prof. H. was here, he was interested in bees and looked after them. Since he has gone the subject has been dropped.''

''Do you ever have any lectures on bees, either illustrated or otherwise?''

''No,'' said Dr. W. ''Now, I have an appointment to keep, so will say good-bye. When you get around this way again stop in and see us.''

Here is a place where a little learning is a dangerous thing and strange as it may seem, it was found among the most learned of our land, whose influence is felt by all the young farmers that are graduated by this institution.

As we go through many of our well kept orchards and note the poor sets of fruit on trees that have blossomed heavily we can truly say that this orchard does not need manure or more spraying, but it does need bees. True, spraying if done at the wrong time, will kill the bees; there is no excuse for doing it when the orchard is in bloom. With very few exceptions the calyx cup will not close for several days after the blossoms have fallen. If you spray while the orchard is in full bloom, the poison spray falls on the sensitive stigma of the flower, injures or wholly destroys it, and you not only kill the bees but defeat the very purpose which it sought, that of a full set of fruit.

Flowers do not yield their nectar to visiting insect without compensation. Inbreeding in either the plant or animal kingdom produces disastrous results, and a Ben Davis apple blossom fertilized by its own pollen sets no fruit, or fruit

of a very inferior quality. Clovers without the aid of the bees produces no seed. The bumble bee aids in pollinating the red clovers.

If we examine apples that have a shrunken and one-sided appearance we often fail to find either a worm or fungus as the cause of the defect, but if we cut the apple open we will find that it contains but one or two perfect seeds and the others are mere shrunken ovules which have never been pollinated.

Prof. Bailey, of Cornell, says: ''Bees are a much more important factor of pollination than the wind, and that their absence is always deleterious.''

A recent government bulletin advises planting mixed varieties, or avoid planting solid blocks of a single variety and be sure there are plenty of bees in the neighborhood to visit the blossoms.

At the Illinois experimental station it was recently found that bees in the neighborhood worked principally on the outside rows of the orchard, and this, with other factors, are the probable cause of this part of the orchard bearing more fruit. With hives located in the center of the orchard, the trees nearest the hives were better pollinated than those farther away.

At Geneva, N. Y., a certain large limb of an apple tree was covered with netting to exclude all insects. Out of over two thousand buds covered, just one fruit matured. The rest of the tree bore a good crop.

It now seems to be a well known fact that the pollen of the apple is slightly sticky and therefore it is necessary to have bees to pollinate the blossoms, as it is almost impossible for any of the pollen to be carried by the wind.

While this holds true with the apple it is not true with the corn. Here it takes wind to make a crop. The bees do work on the pollen of the tassel under certain conditions and do not carry any of the pollen to the silk, but they do shake down great quantities of pollen and much of this is caught on the silk.

Thus while the bees are not essential to the corn crop, when there is no wind stirring they are doubtlessly of considerable assistance.

The report of the inspectors showed that nearly 10,750 colonies were inspected and this was done within the appropriation of $1,000.

The Secretary of Agriculture Hon. N. B. Critchfield was introduced and gave a good humored address.

G. H. Rea read a paper on ''Some Things We Observe.''

Some Things We Observe.

The writer has a tendency to disconnected utterances, and you will observe that this paper is no exception. It is a feeble attempt to bring to this convention the broader outlook of bee-keeping, and must necessarily be somewhat disconnected from the very nature of things. We shall not attempt to cover the whole bee-keeping field, but if we go home a more hopeful and enthusiastic lot of bee-keepers, having learned even one thing new to any of us, or having taken a new or broader view of conditions, I shall feel fully repaid for the effort.

It is not to be expected that all will agree with all of my statements, but that is all right,

''A sorry old world indeed this will be
When all men on all things agree.''

From a practical standpoint, all races of bees have disappeared from the map with the exception of the Italian Their superiority has been proven. Few queen breeders can supply other races.

Hutchinson's adage ''Keep more bees'' still holds good, and the longer the gooder.

Surface is the man of the hour. Let us uphold him in his progressive policies for the agricultural interests of the State, as well as bee-keeping, and hang out the legend, ''Watch Us Grow.''

Manufacturers are selling about three ten-frame hives to one eight-frame. This indicates that either queens are more prolific than in ''Auld Lang Syne,'' or bee-keepers are taking an advance step in securing larger colonies.

The proverbial ''straight as a bee line'' may be as crooked as a dog's hind leg.

If any one thinks that house apiaries are a thing of the past ask Strittmatter.

Have you considered the new government laboratory and experimental apiary at Washington? Pennsylvania needs experimental work.

The fellow who develops his home market doesn't need to care what the goose-bone shows. He is in a position to toast his shins while the other fellow is wondering when the commission man is going to cash up.

If extracted honey is not extracted honey until after it is extracted, then what kind of honey is it before it is extracted?

The states having independent county inspection laws are coming our way one by one.

States and countries having many local or affiliated societies are doing things. Example: New York, Colorado, Canada, New Zealand. Why not we?

Pickled brood develops mostly between fruit bloom and clover. European foul brood, spring and early summer; American foul brood, summer and fall.

The insidious canker, foul brood, is eating the heart out of our industry, and costing the State of Pennsylvania thousands of dollars. Fruit growers, farmers, and bee-keepers suffer alike from it. From the standpoint of their own interests, if for no other reasons, the fruit growers should have bees in their orchards, and get back of the bee-keepers in their demand for funds to eradicate foul brood.

We can get what we want if we ask enough, and enough of us ask for it, "Faint heart ne'er won fair lady."

Foul brood won't succumb to the absent treatment. It takes a man equipped with knowledge, a smoker and a hive tool to eradicate it. Back of him must be organized effort and cash.

Michigan is supposed to hold the record for the most even honey crops one year after another. I don't believe it can beat Pennsylvania. But, Pennsylvania bee-keepers must assert themselves and come to the front as Michigan has.

In spite of the many big bee-keepers in the West having from 500 to 5,000 colonies, and the carloads of honey they produce, I stand to champion the cause of the east, and still have no cause to back down on former statements to the effect that we can produce just as much honey, and have the advantage of the market at our door. Awake! Thou that sleepest!

Colorado, Idaho, Arizona, Texas, California, and other western states are able to accomplish great things because the people there are awake to their own best interests. Liberal appropriation for inspection and thorough organization makes it possible to "Keep More Bees" and do things on a big scale. It is to be hoped that the present legislature will grant us the necessary funds so that we can get on the map.

No state in the union is in greater need of protecting the bee-keeping industry than Pennsylvania. Bees are kept in every county. This is not true of the mountain states of the West. Only about 5 per cent. of Colorado is tillable land. New Mexico, Arizona, and other western states have only small areas cultivated. Large apiaries are common. Bees are easily located and inspected compared to Pennsylvania. Bees here are not as accessible to the inspector and the comparative expense per colony is necessarily greater. We, therefore, need more funds in comparison to the number of colonies to be inspected than do the western states.

We spent too much time parading our own troubles and show not enough interest in other branches of agriculture of which we are a part. Many of us own farms. All should. Let us join hands with the fruit grower, poultry man, dairy man, scientific farmer, horticulturist, sheep grower. They need all the help we can give. That in turn will give a healthy reaction in our direction. Union is strength.

We haven't heard anything lately about "bees swarm to escape adverse conditions," a la Surface. Guess no one has the termerity to tackle the good doctor on the subject.

These are interesting facts. Pennsylvania ranks ninth as to annual honey crops, eleventh in number of colonies, and fifth in average per colony. These figures are according to the United States census for 1910. Among the eastern states we stand second in annual crops, and number of colonies, New York only ahead by about one-third, while we stand first in average yield per colony. Granting that these statistics may not be correct, yet the comparison stands about the same.

The unselfish bee-keeper is the fellow who gets there.

Let each one of us ask ourselves the question, "What are the possibilities of my location, and how can I improve my methods, my bees, my honey crop, and my market?" And what is more, let us endeavor to live up to the Golden Rule, and extend a helping hand to the other fellow. This is the day of days when men

are needed who are willing to make unselfish sacrifice for their fellow-man and the general good of all. Let us get busy!

A discussion on stimulative feeding took place next as to when it was best and the composition of the feed.

The legislative committee then reported.

1. We recommend a liberal appropriation for apiarian inspection.
2. We recommend the regulation and positive prohibition of spraying fruit trees and shrubs while in bloom.
3. We endorse the bill in the House of Representatives making it an additional duty of the assessors of the Commonwealth to enumerate the bee-keepers, their post-office address with the number of colonies of bees in their districts.

J. R. Rambo,
Charles N. Greene,
John O. Buseman,
Alric. N. Coons,
H. C. Klinger.

The auditing committee reported that the Secretary-Treasurer's accounts were correct.

Evening Session.

The meeting was called at 7:30. The place of next meeting was asked for. Philadelphia, Lancaster and Johnstown were offered. Lancaster was the place chosen and that a fall meeting be held in Delaware County.

Huber, Kirk and Hostetter were appointed Committee on Arrangement for the Lancaster meeting and Rambo, Wright and Buseman on the fall meeting in Delaware County.

A motion was made to hold a June meeting in Cambria County and F. J. Strittmatter was appointed to arrange for that meeting.

A. N. Coons gave a short talk on "Marketing Honey," bringing out the thought that honey should be put up in the best shape possible and that a local market should be developed. "Good Combs and How to Use Them," was the next address by the State Inspector of New Jersey, E. G. Carr.

Good Combs.

When the poultryman hears good combs mentioned there at once comes into his mind a vision of a fowl with a symmetrical, healthy-looking comb with five points and a heel, something not easily secured. When the ladies hear good combs mentioned it may mean anything for the hair from the fine-toothed article sometimes used on children's heads to the jewel encrusted ornament for milady's coiffure; but in the writer's mind there is a feeling that good combs to the rank and file of bee-owners is capable of a much wider interpretation even than the same words in the female mind. This opinion is based upon personal observation of the combs in over ten thousand colonies the past three years.

All will agree that the bee inspector has the opportunity for noting the wide range of inside furnishings of hives which no one else can hope to have since he is obliged to study all kinds of receptacles for bees. Some bee-keepers have a wide range of acquaintances of bee-folk and visit apiaries but are likely to visit bee-keepers of like skill or with more skill than themselves rather than those whose bee-keeping skill is measured by their ability to "drum down" swarms.

Incidentally it might be noted that because the inspector meets all kinds of bee-keeping conditions and all kinds of bee-keepers the experience thus gained is probably worth as much as the present salary of the Pennsylvania inspectors, at any rate it goes a long way to offset the unpleasant features of the work.

Judging from the combs as found in the average hives, one of two things must be true: either the apiarists have widely divergent ideas of what constitutes a

good comb, or they do not consider good combs of any particular value over poor combs.

What is a good comb? The writer's idea of a good comb is one containing all worker size cells or with the exception of a small space in each lower corner of not more than a square inch which may contain drone comb or be partly empty, and having no sagged cells near the upper part in which drones can be reared.

It is not unlikely that some one will say, "I can beat that, my combs have no drone cells at all." Maybe so, my friend, maybe so. That is probably the ideal you have in mind, but the next time you overhaul a colony notice very carefully the amount of drone comb present and you will very likely be surprised at the amount of unprofitable comb you are harboring. Not only is it unprofitable but it is actually reducing the income from the hive. Further I will venture the statement that the hives of Pennsylvania average more than the equivalent of a solid comb of drone cells, at least that is the condition across the Delaware.

If a comb is composed of all worker cells and did not reach the bottom bar by three-eighths of an inch, I would still call it a good comb, although one meeting the bottom bar would of course have the preference.

Cost.—In most cases the cost of a good comb is merely the cost of a full sheet of foundation; this applies particularly to one who must eliminate every unnecessary manipulation.

The cost of foundation may vary considerably. That of a full sheet of light brood foundation if bought in single pounds lots will be about five and nine-tenths cents; if in lots of one hundred pounds or more about five cents; if one sends his wax to the foundation-maker to be made up in quantities of one hundred pounds, the cost will be not far from four and one-half cents a sheet.

If one has unlimited time at his disposal the money cost can be reduced by having the combs built without the use of full sheets of foundation by colonies which have swarmed or by weak colonies. So also can one dispense with fire insurance if all who come near the buildings are careful enough to never have a fire, but very few rational persons will consider such a proposition, neither will the wise bee-keeper consider the non-use of full sheets of foundation, since if he has the skill to have good combs built from starters only, he can more profitably employ his time at some work other than fussing with weaklings and swarms.

Value.—To compute the approximate value of good combs as compared with poor ones it may be well to compare the annual honey production of a colony equipped with each.

To be sure, some hives contain more drone comb than others, so it is necessary to base our calculations on what would be a fair average which for New Jersey is about the equivalent of one full frame of drone comb to a ten-frame hive.

Now let us suppose a ten-frame colony with good combs produces fifty sections of honey per year, which is a conservative estimate. The use of one-tenth of the comb capacity of a hive for the production of drones will in a single season reduce the output of a hive at least four sections, due to the drones occupying space which should be given to rearing workers, the loss of time of nurses in caring for the drone brood, and the loss occasioned by food given to drones both brood and mature, which could otherwise have been stored in the surplus apartment.

This it will be noted will be an annual loss so long as these poor combs are used and will amount to no less than fifty cents per annum. To this must be added the sum, not easily computed, representing the labor of caring for increased swarming caused by an abundance of drones. It is safe to place the annual value of good combs at not less than seventy-five cents over poor combs or the average combs as used at the present time.

How secured.—As already intimated there are two ways of securing good combs, first, by having them built from starters by colonies in condition to build worker size comb only, or secondly, by using full sheets of foundation in wired frames. The first method cannot be considered by the practical apiarist because of the time necessary to care for colonies in condition to do this kind of work, hence the latter way is the only logical one for a practical bee-keeper.

Swarms both natural and shaken can be hived on full sheets of foundation but this is apt to result in sagged combs if the swarms are large as they should be.

The plan favored by the writer is to have the combs built in the second story where they are not clustered on heavily enough to cause sagging, and where the comb is drawn down and fastened to the bottom bar, making as near a perfect comb as is practical.

In case combs are built in the first story where as a rule they are not drawn down to the bottom bar it is suggested that a three-eighth inch strip be cut from

the bottom of the comb and turned bottom side up on the bottom bar, thus inducing the bees to close the space between the two edges of comb.

Summary.—There is a wide range of ideas as to what constitutes a good comb. The cost of a full sheet of foundation to insure a good comb is from four and one-half to five and nine-tenths cents.

The producing value of a hive equipped with good combs over the average hive is about seventy-five cents a year. The most practical way to secure good combs is to have them built from full sheets of foundation in wired frames in a second story.

F. J. Strittmatter then read a paper on "A Year's Work in an Out-yard."

A Year's Work in an Out-Yard.

I do not know why I was asked to take a part on this program and I fear I may not be able to give you anything of much value, but I will not take much of your time.

I started in bee-keeping as a specialty 13 years ago, but we started our two out apiaries only five years ago, or in the spring of 1910. One was started outside in Root chaff hives and for the other we built our first house apiary.

The first year and about half of the next I went back and forth on a bicycle but did not like it very well and bought a motorcycle. This was better but not altogether satisfactory, as I could not take much with me, so I sold the motorcycle and bought a second-hand automobile which I liked much better. We now have three machines, runabout, touring car and a 1 to 2-ton truck.

I aim to visit our out yards regularly once a week through the honey season and sometimes I make an extra trip if I have time.

We do some market gardening on the side and I do most of the selling and make two or three trips a week with our truck, handling this in the summer, so between the bees and the marketing I am on the road nearly every day and to get things done in time I must go regular, hence the importance of good reliable machines and house apiaries. In the house apiary I can do most anything in practically any kind of a day in season. And for going back and forth if I had to do without an auto I believe I would be ready to sell the out apiaries, as I doubt if I could run them at a profit. I find the auto as reliable as a horse and much quicker, with the added advantage that I can drive right up to the bees or in among them where I would not dare take a horse. I believe I have worse average roads than most of you have but I find with proper care a machine will go practically any place a horse will go during the honey season.

We have all our bees in house apiaries now and would not like to go back to the outside apiaries for several reasons. We find in the first place we can get considerable more work done on account of being able to have things handier as well as being independent of the weather.

We use all ten-frame hives, having same built in solid in the last two houses we built, while in the first one we put in hives previously nailed up. We run for extracted honey almost exclusively, producing a little comb honey at the home apiary only.

We go over all colonies in the spring as soon as the weather permits and see that all queens are clipped as well as to clean out any dead bees or other refuse that may be in any of them, and note general conditions. We make a more thorough examination at this time than at any other time of the year. In fact, many colonies may not have their brood nest disturbed again till fall, unless we have reason to suspect disease. Of course, if a colony does not progress properly, it is examined again to ascertain the trouble.

We are careful to place supers on all hives before they seem to be really needed as by so doing we have no trouble keeping our extracting colonies from swarming. With the exception of the summer of 1911, when we lost about half a dozen swarms, which was brought about by my getting behind with my work and the bees getting crowded for room, we have not had a swarm to my knowledge at either of our out apiaries.

I figure that as to cost while we had to make an extra investment to change to house apiaries, the expense in case of starting a new apiary is very little more for a house apiary than for chaff hives and a necessary supply house. But of course you would not want to build a house apiary unless you were satisfied that

you would want to keep the same location for a number of years and could buy the ground reasonable.

Getting back to management one thing we are very particular about is to leave all our honey on the hives till it is thoroughly ripened and of good heavy body. We even prefer to have a lot of our clover and buckwheat honey mixed than to sacrifice the quality by extracting unripe honey.

While we take off some of the light honey before the buckwheat honey flow starts usually, we do not extract any till after the honey flow is over unless we need the honey for our trade or run short of combs.

The reason for this is that we can save time and especially save time during the honey season when we are the busiest. We extract all our honey at home, and believe we save by so doing as we can haul the supers home easier than to bother rigging up a convenient extracting arrangement at out apiaries.

We sell our honey mostly to the grocery trade selling to the retailers direct. In fact we have demand for more than we can produce, and handle every year the crops of several other producers. We sell mostly in glass jars, buying same from the glass company in car load lots. F. J. STRITTMATTER.

The President, Dr. Surface then gave an interesting address on "Relation of Legumes to the Soil and Bee-Keeping."

This was followed by general discussion for some time.

The Committee on Resolutions reported as follows:

The Pennsylvania State Bee-Keepers' Association in its 11th annual convention assembled at Harrisburg, Pa., February 23-24, 1915, beg leave through its Resolution Committee to make the following report:

1. That we tender our thanks to the Department of Public Grounds and Buildings for the use of the House Caucus room for our sessions.
2. That we appreciate the untiring efforts of our officers, both of those retiring and continuing.
3. That we heartily and unanimously disapprove of the Agricultural Commission Bill, as we believe that it is not only a useless and expensive measure, but will greatly hamper the work of apiary inspection and the other departments of the Agricultural Department which is doing such meritorious work under its present efficient system of management. We trust that such influence will be brought to bear that this bill will be defeated. We humbly solicit the assistance of our governor along this line.
4. That a copy of these resolutions be sent to the governor, also to the daily papers and be spread on the minutes.

F. G. FOX,
L. K. HOSTETTER,
F. J. STRITTMATTER.

The convention then adjourned. H. C. KLINGER, *Secretary.*

Report of the Fourth Annual Summer Meeting, Aldan, Pa., September 11, 1915.

The meeting was held in Chas. C. Wright's apiary and was called at 10:45 o'clock by J. R. Rambo who in the absence of the president was made chairman.

No special program having been arranged for, a committee soon had found a number of speakers who volunteered to do some bee stunts.

John O. Buseman of the City of Philadelphia spoke on "Present Conditions of Honey Flow." He said that 205 colonies since the 25th of August had stored over 5,000 pounds and the honey flow, if the weather is favorable, will last for at least a week longer. This flow comes from the Burr Marigold, a flower found in the lowlands and islands in the Delaware River.

J. R. Rambo then gave a practical demonstration of "How to Raise Queens," after which Mrs. Gertrude Weaver showed "How to Winter Weak Colonies," and gave a quick method of uniting nuclei.

A call to lunch was heard and seventy-five hungry bee men were soon found around tables under shade trees on the lawn and enjoying the good things prepared by Mr. and Mrs. Wright. A vote of thanks was tendered the hosts for their kindness.

"How Shall We Winter" was then discussed by Thos. O. Werner. He prefers to winter in two full bodies with cushion filled with chaff or ground cork on top.

Dr. L. M. Weaver spoke on "Organization." He gave a history of the Pennsylvania State Bee-Keepers' Association, how its first attempts to have a bee-law passed were ridiculed, how, when the next legislature passed a bill the appropriation was cut off and the inspectors began work gratuitously.

E. G. Carr, of New Egypt, N. J., the inspector of that state, spoke on "How to Cure European Foul Brood."

The Alexander method fails with some people because they fail to use it properly. Three things are necessary: Colony should be strong, must be made queenless and a queen from good stock introduced.

Dr. C. B. Shortlidge gave his experience in moving his bees (fifty-two colonies) to the Delaware River to get the advantage of the Burr Marigold flow.

F. G. Fox spoke on "Odors of Honey." Every bee man should be able to tell honey by its distinct odor. Clover scarcely has any, Linden is stronger, Buckwheat has a very strong odor and Golden rod can be plainly noticed on coming in the apiary.

"Producing Comb Honey" was then demonstrated by Jno. O. Buseman.

Geo. M. Steele next spoke on "Introducing Queens," after which a long time was taken up in general discussions on different questions asked by members.

H. C. KLINGER, *Secretary.*

Report of the Twelfth Annual Meeting, Lancaster, Pa., March 3-4, 1916.

The Twelfth Annual Convention of the Pennsylvania State Bee-Keepers' Association was called to order in the Chamber of Commerce rooms, in Lancaster, on Friday afternoon, March 3d, at 2 o'clock by President H. A. Surface.

In the temporary absence of Secretary-Treasurer Klinger, the President appointed Mr. T. Warren Metzger, of the Agricultural Department of the *New Era,* of Lancaster, as Secretary pro tem.

President Surface announced that the minutes of the last annual convention would be dispensed with in the absence of the Secretary —as well as the roll call, which would be done at the evening session upon Mr. Klinger's arrival.

The president then took pleasure in announcing as the bearer of the address of welcome Mr. R. M. Reilly, Esq., First Vice-President of the Lancaster Chamber of Commerce.

Mr. Reilly spoke substantially as follows:

"LADIES AND GENTLEMEN:

"In behalf of the Lancaster Chamber of Commerce I take pleasure in extending to you a cordial welcome to the city of Lancaster. I must confess that I know little of the wonderful industry represented by the ladies and gentlemen present, but in a little chat with Dr. Surface I learned this, that the value of the products of your industry in this State exceeds perhaps a million dollars, and if all the statistics could be gathered that amount might be doubled.

"Lancaster is very glad to welcome you here. I hope your stay among us may be pleasant and your deliberations profitable. I believe you will find Lancaster a no mean city. Its blended citizenship cannot be surpassed. The English immigrants left, of course, the first impress upon us—for instance, the nomenclature of the streets, such as King, Duke, Queen and Prince. But later there came another element from the north of Ireland, which gave us the Donegals, Colerain, Drumore, Rapho, which indicate their Irish origin. Then came the Welsh admixture, which gave us Cærnarvon.

"Yet I think those of us who sprung from other nationalities must concede that the backbone of Lancaster County's citizenry came from the Palatinate, as well as the Huguenots, who made this fair land blossom like the rose.

"So we think you have done the fitting thing to select the 'Garden Spot' as your meeting place. It has the finest agriculture and the most intensely developed. Its ten thousand farms have a productive value of something over twenty millions of dollars.

"But added to its great material resources are the splendid national characters it has produced. I needn't tell you that where the monument now stands in Centre Square the first Continental Congress met; or that we raised up Pennsylvania's first President. Here, too, lived another who preserved to Pennsylvania its great common school system—Thaddeus Stevens. We also gave our great soldier, John F. Reynolds, who fell in the first day's fighting at Gettysburg. These, and many more.

"But, remembering the couplet I learned in my youth:

"'How doth the busy bee
Improve each shining hour,'

I am constrained not to trespass on your shining hours, but shall conclude, as I began, by extending you Lancaster's warmest felicitations, and hope you will enjoy your stay amongst us, knowing that you will always find when among us the latchstring on the outside."

President Surface responded. He said he appreciated the heartiness of the welcome, because he knew it came from the heart.

Lancaster County, he declared had made a name for itself as the greatest county in the world—not only great in soil but in citizens, as well. He liked its men, because they are practical, who work with their hearts, their heads and their hands. He appreciated the so-called Pennsylvania Dutch, and found in them a sturdiness that was to be admired. Lancaster County was the great melting pot, for in its boiling and seething the dross and impurities were burned out.

Individual citizens, he declared, are more and more playing a conspicuous part in the life of the nation, state, county, town and borough.

The Bee-Keepers' Association, said the President, was the largest one in Pennsylvania devoted to one branch of agriculture, with over 300 members.

Let us get the very best results by getting acquainted with Lancaster's sturdy citizens, he declared. Get the point of view of new intellectual farmers.

The Bee-keepers of the State have about $2,000,000 invested in their business, and until last year we were without an inspection service. In this one year from five to seven counties were inspected for foul brood.

There are 225,000 farmers in the State, and every one in ten, it is estimated keep bees, making a conservative estimate of the bee-keepers 22,500. Yet, strange to say, it is in the most rugged and rocky sections that we find the most bee-keepers. In Lancaster County there are, perhaps, seventy-five members of this Association.

Prof. Surface concluded his address with remarks on the subject of economy and the optimism of bee-keeping, as follows:

"In this economical living," said Prof. Surface, "many of them have become bee-keepers, because the bees help them to gather and save what would otherwise be lost.

"There are thousands of barrels of honey annually lost in this State, because not saved. In this county, and in this audience, are persons who are engaged in the business of saving annually by the barrel and more than the barrel. This economy reminds us of that recently recommended by the authorities in Germany, when they said that the blossoms of alder, hazel, etc., should not be gathered for ornament, even though they are wild flowers. This is because they will furnish nectar and pollen for the bees and nuts for the children.

"We must learn to practice as strict economy as that of our neighbors, if we hope in the course of years to compete with them in the struggle for existence.

"I have learned by experience and observation that the bee-keeper is an optimist. He sees the nectar in the blossom, the industry in the bee and the honey in the comb. The onlooker is a pessimist. He sees the sting of the bee; the worms and diseases in the hive; the drudgery and trouble in bee-keeping.

"The optimist sees not only the utility of the bees, in producing the most delicious of food for mankind in the way of honey, but also in producing fruits in greater abundance by carrying pollen in the essential process of fertilizing blossoms.

"He would keep bees for the sake of learning more concerning their intricate lives and industrious habits, even though it were not a matter of financial profit. To him the work of bee-keeping becomes a labor of love, and a means of pleasure or recreation.

"He is born with the spirit of the true agriculturist or husbandman, rather than that of the mere laborer. Yes, verily, he is an optimist, for he sees the sweeter, the better and the brighter side of life.

"The pessimist says 'every rose has its thorn.' The optimist say: 'Oh, the world is full of roses, and the rose is full of dew, and the dew is full of heavenly love that drips for me and you.' "

The next subject on the program was a paper by Mr. L. B. Huber, of Landis Valley, Lancaster County, on the subject: "Constructive Farming and Bee-keeping," which was highly interesting from a practical standpoint, and served to elicit a discussion that lasted for over an hour, to the point of adjournment, which was participated in by many of the members.

Secretary Klinger arrived before the close of the meeting, and occupied his chair.

President Surface appointed the following as a Committee on Resolutions: Messrs. Faucett, of Chester County; Rea, of Jefferson County, and Strittmatter, of Cambria County.

Constructive Farming and Bee-Keeping.

L. B. Huber.

The question of a more constructive agriculture and the conservation and restoration of our farm lands is a nation-wide one, and calls for the exercise of thought and study.

The bee-keeper, though not necessarily a farmer, is interested in this subject, from the fact that his work is so closely allied with it and may be said to be an agricultural pursuit.

The great majority of bees are kept on farms and by farmer bee-keepers. Bee-keeping is constructive in that it is the means of obtaining for the use of mankind a natural product of honey and wax, that would be lost were it not for the honey bee. The honey bee is also of inestimable value in cross pollinating the flowers of various economic trees and plants. *A real farmer* is a constructive farmer, and should strive for a higher standard, and promote a better agriculture, that will make for the betterment and enrichment of this earth. Personally, I am in sympathy with this subject, as a farmer bee-keeper and fruit grower. But in presenting my views and practices there is no desire to reflect on the judgment of anyone who differs with me or sees fit to think otherwise. These deductions herein outlined are based on my own observations and practices.

God made the earth, and it is from the surface of the earth that we draw our sustenance. We have no moral right to waste or abuse this marvelous heritage. Geologists tell us how soil was formed from primitive rocks; how the various mineral substances are distributed through it; that ages have elapsed while this wonderful transformation of soil-building was going on. Furthermore, the chemist informs us that there are stored in the surface of the earth what we call soil, a vast amount of inert plant food, that becomes available slowly. How some sections have more of this plant food stored in the soil than others, and in different degrees of availability, has also been told. These facts become intensely interesting to the soil-tiller.

It is a lack of working in harmony with nature, and with nature's God, that is responsible for depleted fields and gullied hillsides. I am an advocate of maintaining a proper balance between clean culture crops, grain and grass crops. There are very few farms, comparatively, that do not have some land on them that does not yield returns that make its cultivation justifiable. Steep and rocky hillsides are an example. Men are rarely trying to work successfully such lands, which are better adapted to tree-growing, or pasture. There may be exceptions; some farms may be all hilly and stony, and on such it is of the utmost importance that this diversification be observed. Others are quite level, and are not subject to destructive soil erosion, and can be given over to a greater extent to clean culture crops.

The controlling factor of a fertile soil is humus. A soil full of humus is retentive of heat and moisture, and is less liable to wash than one deficient in that element. It would not, perhaps, be out of place to mention my own farm, which is devoted to wheat, corn, potatoes and fruit, that formerly suffered loss from soil washing. We have by careful handling reduced this damage from washing to a minimum. It has been my practice to grow a cover crop whenever practical, always aiming to have something growing on land after the regular crops have made their growth or are removed. I have tried various crops for this purpose with success. I do not use leguminous crops for this purpose. The clovers are used in the regular rotation for hay.

The aim of a cover crop is to make a large growth in a short time, and thereby shading the soil, and adding more humus. I have tried different crops for this purpose, and have them reduced to just three—buckwheat, turnips and rye. These, all things considered, suit my requirements admirably. I consider buckwheat a great soil improver, if used in this way. I have sowed it after the early potatoes were dug; also turned down an old sod in July, harrowed once, drilled two pecks of buckwheat and two pounds cowhorn turnips and leveled with a drag. This is double the amount of seed needed in seeding after potatoes, but on account of the difficulty of properly fitting an old sod a larger amount of seed is required.

I do especially recommend this treatment of an old sod. It is a well known fact that an old sod is an ideal breeding place for many destructive insects. If it is desirable to do still better after the frost puts an end to the buckwheat, rye can be sown broadcast over the mass of buckwheat and turnips and covered with a disk harrow by going over it once or twice. If this combination is supplemented with the usual manure and fertilizer applied on sod for corn or potatoes (with me it was potatoes), the chances for success are favorable. If anyone has his doubts about this I would recommend a trial of an acre or so and like to hear a report of the results.

It will be seen that it will pay to grow buckwheat in this way, without any reference to bee-keeping at all. Every bee-keeper knows the value of buckwheat as a honey-yielding plant. What would be the result if a considerable acreage of buckwheat were thus sown in the late summer in a given community? It would likely result in a veritable bee paradise coming at a time when the honey flow from other sources is limited. It would stimulate fall brood rearing, as well as provide for winter stores.

Sweet clover is well known among bee-keepers as a honey-producing plant, but the virtues of this useful plant to farmers in general are as yet not well understood. It is considered by many as a noxious weed. This is the plant that can be said to be a true conservator. It is the plant for waste places; it delights to grow under adverse conditions, where nothing else will grow—along bad roadways, in and about stone quarries, along ditches and gulleys. The fact that it is a legume and that it does not occupy the good, arable fields and is very easily exterminated makes it a very valuable plant, and its dissemination should be encouraged by all bee-keepers.

Another phase of this subject is tree-culture. There is at this time considerable agitation to encourage tree-planting. Every lover of trees should use every proper means and occasion to foster and create a greater interest in it, for economic reasons, as well as for the beautifying the landscape. Men are rarely trying to work successfully steep hillsides, that would in the long run give better returns if devoted to tree culture.

If there is any such land on the farm it should be used for this purpose, part of it for orchard if suitable and so desired. At any rate, most farms have some land that can be profitably utilized for a wood lot. On my farm I have trees set out thirty years ago that are now serviceable—Maple, Locust, Catalpa and Walnut, that have made good growth and are bearing nuts.

There are some good honey-yielding trees that bloom after the fruit bloom is over and before the regular honey flow is on. The locust, which is a legume, is valuable as a soil improver. The tulip poplar, as it is known in this locality, is a yielder of a rather dark honey. It blooms in this section at the commencement of the clover flow, and is a sure pollen and honey-yielder. As an ornamental tree it is one of the most beautiful, growing in a conical form to a large size, producing an abundance of its large tulip-shaped flowers. By proper pruning it can be made more compact in its growth, and adding to its beauty as a shade tree near the house.

The basswood, or linden, is a desirable tree for ornamentation, especially along driveways, and for shade. It is a rapid grower and its wood for manufacturing purpose is very valuable. The nice clean honey sections are made of this wood, of which most bee-keepers are aware. For a wood lot I would advise a goodly number of basswood and tulip poplar trees. These two varieties are becoming scarce in this locality and their propagation from seedlings might prove profitable.

Then there are the different species of maple, but they are of less importance, as they are fairly well distributed in most sections.

In conclusion I would mention the opportunity afforded the bee-keeping fruit-grower who knows the value of the honey bee for the pollination of the blossoms to disseminate this knowledge among his fellow fruit growers, as well as to discourage spraying trees while in full bloom, to the detriment and probable de-

struction of large numbers of bees. Some of the best authorities on fruit culture now advocate the placing of hives of bees right in the orchard during bloom time, to make sure of fertilization in case of cool and cloudy weather during this period, when bees would not venture from their hives.

Landis Valley, Lancaster Co., Pa.

Dr. Surface opened the discussion by asking whether everybody present at the session realized the practical value of the paper. Pardoning the personal allusion, said he, I will say that I have been on Mr. Huber's farm and know conditions there as they really are. The paper, he declared, was worthy of being published in any agricultural paper or bulletin.

Opening the discussion, Prof. Surface, alluding to Mr. Huber's reference to buckwheat-growing, said it had four pre-eminent qualities: As a soil loosener, and killer of weeds; as a nectar-provider for the bees; as a food for fowls, and as food for pigs. He said the hogs he started on buckwheat were better by far than any others. He was interested to know what Mr. Huber did with his buckwheat, and also recommended the adding of crimson clover to it, for it prevents the leaching of the soluble nitrates of the soil. It is a legume plant, and gathers nitrogen from the air and stores it in the soil. It also helps to solve the problem of what to do for fertilizer.

President Surface thoroughly coincided with Mr. Huber in acclaiming buckwheat a valuable crop. He also was strong for the cowhorn turnip, claiming that it makes for a balanced ration for the sheep and cattle in the winter (and you certainly don't grow enough sheep in this county). So, he concluded, facetiously, you have buckwheat cakes, and honey to spread them, free of charge.

Mr. Huber: We're not making buckwheat cakes, at least from our own buckwheat. I just let it die off. He stated that he had sown rye in the buckwheat. The latter is not sown too early.

Prof. Surface: Buckwheat keeps the best soil fertility from washing away. It is important also to have a living green crop.

Mr. Chapen, Shickshinny, Luzerne County: Said his experience with turnips was that they crowded out the crimson clover.

Prof. Surface: You must cut down the proportion of turnip seed when sown in crimson clover. If you sow six to eight quarts of crimson clover to the acre, you should not sow more than say a half-pint of cowhorn turnips. One seed to a square foot is plenty. They will then give good roots.

Prof. Surface also recommended the cowhorn turnip for the table. It is the best of all the turnips grown, without the rankness of flavor or odor.

Question: How late in the season should buckwheat be sown?

Mr. Huber: About the middle of August in our locality.

Prof. Surface: Confirmed Mr. Huber, his pigs fattened on the buckwheat sown at about that time.

Mr. Chapen: That is too late in Luzerne where our elevation is 1,200 feet. The latest we can sow is about the middle of July.

George H. Rea, Jefferson County: Found it hard to raise successfully the same crops as in Lancaster County, because climatic conditions are different. He had seen frosts as late as the first day of June; even one year saw snowflakes fly on the tenth of June. Sows not later than the Fourth of July. Finds buckwheat a very important

crop. Ripens rapidly after the first month, but finds it very susceptible to weather conditions. Hot weather, and dry, is very hard on buckwheat. In the blossoming time he had seen as much as 100 pounds of surplus honey stored in ten days' time. Three years ago he stood on an elevation near his farm and counted no less than 300 acres in buckwheat, showing to what extent the crop is grown in his section.

John DuBree, Jenkintown: Would it pay to buy buckwheat seed to have an adjoining farmer sow it, so that one's bees could gather the nectar?

Prof. Surface: Didn't think it would pay altogether on these conditions. Said it had been proven that it pays to provide no crop ostensibly for the provision of nectar. He referred to the mellilotus alba, a high sweet clover from the Buckeye State, which Buffalo had planted in its open spaces and from which it had derived great results The Bee-Keepers' Association was soon increased, as well as the production of honey.

Mr. Faucett, Chester County: Preferred the drooping Linden both for honey-production and shade.

Prof. Surface: Was impressed with the great number of locust trees he observed on his way from Harrisburg. This means that there are tens of thousands of barrels of honey going to waste. He knew one man in this community who produces more than ten barrels of honey who is still getting only a portion of the nectar in his community. The important point is to get the honey load when the load is here. The locust is not like the clover. It must be taken at the bloom, while clover will stay for a little while.

John O. Buseman, Philadelphia: Found on an inspection of Mr. Faucett's apiary that the locust trees gave an aroma to the honey that could be smelled all over the yard.

Prof. Surface: The art of the bee-keeper is to make the colony strong when they should be strong. The oldtime bee-keeper would get his colony strong just as the load was passing away.

W. D. Seliers, Lancaster: Always wants a reserve set of combs, and doesn't want any stimulating in the spring; by the time the fruit bloom is over the hive below should be full of bees. He was in business to sell light honey or dark honey, as the trade demanded. Neither did he believe in too much interfering with the bees.

Question: Can sweet clover be sown without inoculation?

Prof. Surface: It can on alkaline or sweet soil. He recommended the liming of the soil. If sowed without hulls, can be sowed now to good advantage. If sowed with the hulls, it should be sowed in the fall or winter.

In reference to hulled seed scratched, he said that it was done so that the moisture would the sooner enter the seed, causing it to germinate sooner.

Question: Can sweet clover be sown with oats?

Prof. Surface: Wouldn't try it. Not considered economically profitable. In answer to a statement by a member, who said his stock would not touch sweet clover, Prof. Surface replied that that also was his experience. He believed the appetite for it must come like the appetite of man for tobacco.

Mr. Huber: His experience was just the opposite, for, growing a

little of it on the outside of his farm fence, the cattle seemed to like it so well that they pushed the fence over to get to it.

Prof. Surface: Believed the stock would feed on it when quite young and succulent. Another point: They may take to it when led out from the stable, but, after being on forage for a few weeks, would pass it by.

Mr. Klinger: Believed the secret was in making the cattle hungry for it. Turn your cattle out, but keep them away from the clover field, so that they can't get in. Or if you make hay, put it in the barnyard at a place where they can't get at it. The humor was well appreciated.

Prof. Surface called on Dr. I. H. Mayer, of Willow Street, Lancaster County, the President of the Pennsylvania Horticultural Society, for remarks.

Dr. Mayer responded by saying that he believed the reason for most of the trouble people experience in feeding sweet clover is in not giving it to them when fit to eat, when it is old, woody, and coarse.

Had considerable experience with it. Grows wild along the Low Grade freight line of the Pennsylvania Railroad in the lower end of Lancaster County, and you couldn't get a hungry mule to eat it. But when cut young and tender, say from fifteen to eighteen inches high, mules, horses, hogs, chickens and turkeys—all will eat it.

At this point the discussion was brought to an end for the afternoon.

Evening Session.

The meeting was called at 7:30 by the President.

The minutes were read and the roll call was responded by seventy-five bee keepers representing 1,592 colonies of bees.

The first subject taken up was the report of the Foul Brood inspectors.

The three state foul brood inspectors, J. R. Rambo, of Collingdale, Pa.; John O. Buseman, of Philadelphia; and G. H. Rea, of Reynoldsville, Pa., reported that 9,384 bee colonies, all told, had been inspected by them in Pennsylvania at a cost of twenty cents per colony. Of those inspected only a couple hundred were found to be infected with bee diseases.

Mr. Rea said that the foul brood problem is a very serious one to say the least and every bee-keeper should be up in arms against it. During his work of the past year he traveled nine thousand miles, passing through many counties of the State and inspecting 6,124 colonies. He said he found that many farmers keep bees without their neighbors knowing anything about it, and that keepers are not always desirous of having their hives inspected. One unfortunate thing he found to be that hundreds of bee-keepers pay little attention to their hives and read little literature upon their work. He said that, as a consequence, many do not understand the diseases that infect their hives. The speaker was enthusiastic for foul brood inspection and foresaw a great work that it could accomplish in the future because of the willingness with which farmers take hold of the suggested improvements in their work with the bees.

Dr. Surface in commending the work said the operations of the

coming year would be a series of demonstrations. It would be made a campaign of education. The foul brood situation is a menace. Don't think "It mochs nixous." It is a serious thing.

Miss Ella Starr Brinton of West Chester then read a paper on "Bee-Keeping, A Hobby for Girls."

Bee-Keeping—A Hobby for Girls.

By Miss E. S. Brinton.

At the very beginning I wish to say I am not an expert on any phase of bee-keeping, and cannot boast of phenomenal increase, high bred queens, or great harvests of honey. I started with my first bees eight years ago and now have six colonies—quite plenty for a backyard that is supposed to be the family playground. We have honey to eat, to cook with, to give away. The bees have paid expenses and I have had no end of pleasure out of them. Of course, I have ambitions to do more, but at present I am simply an enthusiastic amateur with bee-keeping as a hobby.

I believe in hobbies. What it is, makes little difference so long as it is something that calls forth the best that is in one and not the worst. It should be something so interesting and entertaining that it will absorb the leisure hours, provide food for thought during idle moments and quicken the desire for study and reading. If your life is already too full of care and matters of a serious nature, use a hobby to lighten the burden. Turn to it for play, rest, relaxation, amusement, and the pure *pleasure* you receive is sufficient recompense for the time and trouble you may expend.

In taking up the subject of bee-keeping for girls my mind turns first to the girl of limited means and opportunities. She may be living in town or country. She has had a public school education but is ambitious to do more; hungry for outside interests and to have and do something for herself—yet because of finances, family conditions, or health, she cannot leave home or make any radical change in the routine of living. To this girl especially I recommend bee-keeping. It opens a door of marvelous interest. Through it is a wide field for mental and physical development.

The cost of starting is small. If any kind of good judgment is used there is a possibility that this hobby will not only pay expenses but also yield a reasonable interest on the money invested, and to a girl who must count every penny this item alone is worth considering. A great deal has been written on the subject of income from bee-keeping, and the tendency has been to quote from the experience of men and women of years' training in the business. This is misleading to a certain extent. The beginner plunges in with all confidence of success at once, forgetting that he or she must first learn the very rudiments. Mistakes *will* be made—perhaps not to fatally injure the colony, yet serious enough to knock all prospects of profits for that season.

Notice the different vocations and professions in which a girl will gain knowledge in connection with her hobby of bees. First, local botany and geography, as it would influence the honey crop. She should start with her immediate neighborhood, study the trees, shrubs, and wild flowers and the time of their bloom; which will yield pollen and which nectar. What is the nature of the farming country and how would it influence the bees, that is, are there large acreages of swamps to yield a fall crop of honey, or is it an upland region of clover, alfalfa, or buckwheat. Seasonal temperatures and weather conditions should be noted, for while books and bulletins give general directions every locality differs and each one to a large extent must work out her own problems of management and wintering.

A knowledge of simple carpentering, and the use of tools and painting is necessary, for to buy the hives already set up is extravagance. Full directions for fitting the pieces of hives come from the manufacturer, and any one who can read the patterns of crocheting and knitting can understand these.

The possession of honey in quantity will bring a desire to use it in cooking; to make syrups, honey ice cream, cakes and candy. The *Farmers' Bulletin* on this subject will be an incentive for experimenting in the home kitchen.

Selling the surplus will be a problem all its own. Probably the whole question of profits will depend on whether the girl herself can also become a good sales-

man and can create a market for her honey, bees and wax. To do this she must mingle with people. Overcome any shyness she may have and learn to talk interestingly and intelligently. She must adopt some scheme of keeping records of hives and queens. She learns to correspond with business houses, to handle money, to do simple bookkeeping and accounting. Bee-keepers' associations will bring her in contact with fellowmen of like interests, and she will gain an inspiration and a deeper knowledge that never comes from books alone.

Perhaps most valuable is the feeling that the bees are her very own property, and the entire responsibility of their comfort and welfare depends upon her initiative. The family, old or young, cannot advise or make suggestions or interfere, for *she* only knows and understands the situation. It is quite probable that she will have a task to get the first permission to bring them on the home premises. Every reason under the sun will be offered: "there is no place to put them, they will sting the horses and people, they will eat the fruit, and so forth." The only way to overcome this sentiment is to make a bargain for a year's trial, and then make every attempt to keep the bees from annoying anyone. Get the family and neighbors interested in the details of their life history, and as soon as possible produce enough honey to make a peace offering.

A very important question arises—"How shall I begin bee-keeping when I do not even known a bee when I see it?" Emphatically the answer is: Begin slowly. Don't do as one young man by advertising for twenty-five colonies of Italian bees. He was fresh from the city, and had never been in contact with country life except for summer vacations, but even then he should have known better. Of course there was a failure. He became discouraged, lost his nerve after a few stingings and by the second summer his bees were not in evidence.

One colony of bees, properly cared for, with the usual annual increase, is sufficient to engage all your spare time and thought. Bees that are neglected can become a grand nuisance, and also a positive danger to other bee-keepers. If you get tired of your hobby by the middle of summer you can not give it away like a pet canary; chloroform, shoot it, or sell it, like a cat or a dog. You are dealing with a force of 30,000 individuals each armed with a formidable weapon, and at the faintest disturbance they will pour out to defend their citadel.

Read Kipling's story, "The Mother Hive," found in his book called, "Actions and Reactions," and also Maeterlinck's, "Life of the Bee." Bee-keepers as a rule have little patience with the latter book on account of the mistaken idea that it is a text-book. It is not. The author says in the first sentence he did not intend it for a treatise or a practical hand-book. I value it for its inspirational description of the inside of the hive and the habits of the bee. To the mere onlooker bees are nothing but a crawling mass of insects without method or reason. Maeterlinck gives each bee a duty and a place in the kingdom with such vivid words that the most casual reader can comprehend it.

One of the difficulties in starting a new subject like bees is that an entirely new vocabulary must be learned, and the beginner fairly has mental indigestion over the new words, phrases, and especially the conflicting ways of operating. Get all the authorized books on bees you can afford, but my advice is to secure the government and state bulletins and depend upon them entirely for a guide the first year. You cannot solve a problem in bee management by combining the methods of six different people—any more than you can make a good cake by using six recipes at once. At least an inexperienced beginner will not succeed The second year subscribe to a magazine if you wish, and also be sure to take the corresponding course in bee-keeping from your State College. Your previous experience will enable you to use both of them more intelligently.

Now as to getting the bees themselves. The cheapest and easiest way is to get some plain dark bees in an old box hive and do the improving yourself. I bought mine from a neighbor, paid $3.00 for it, and helped carry it home and set it down in the midst of my flower garden. That was in March. In the meantime I ordered from a supply house two hives and two supers, knocked down. The putting together of these was as fascinating as a picture puzzle. I split some pieces with poor nailing and made mistakes with others, and finally painted too many surfaces of the hive, but I did it myself and was wiser for the doing. In fruit blossom time the bees were transferred to the new hive. That was a wonderful day for I had my first glimpse of the inside of a hive and learned to recognize the queen on sight. I knew nothing of the operation but was assisted by a brother who had had a year or more of experience. The bees were as quiet as flies. We discarded all veils and gloves so as to work unhampered, and two small children played about and enjoyed the dripping honey.

Now that my bees were in accessible hives I enjoyed them even more. I remember my first question to Mr. Selser at his Philadelphia office was, "How often may I look in?" His grave answer, "About once a day," was a conservative one; but I would say to a beginner: "Look in as often as you wish." The important thing is to learn exactly what the bees are doing and how much they can accomplish day by day—and no book can take the place of personal observation.

That year was one of the record breakers for white clover harvest, so even with all my interruptions the bees gave me two supers of honey and I was tremendously proud of them. After the honey harvest, I attempted to introduce Italian queens—all the books said this was the ideal time. Then every thing seemed to go wrong. Those bees hitherto so peaceful and quiet and absorbed in their own affairs became possessed of tempers like Satan himself. Instead of flying off to the fields in the morning, they just loitered around at home waiting for something to happen—there seemed to be literally millions of them and finding that restless black queen was worse than any needle in a haystack. Also I had such confidence in my control of them that the matter of self-protection was overlooked entirely. I was dressed to be comfortable for the summer season, short skirts, low shoes, elbow sleeves. O, yes, I wore a thin net veil and some kind of short light weight gloves, so my fingers would not be clumsy. That was according to the books, only some advised cutting off the finger tips. Talk about losing my nerve! Before that job was done I wished I had never seen a bee. I was willing to forego eating honey forever, if some one would kindly remove the creatures from my back lawn and give me again possession of my flowers and garden. Worst of all there was no one within reach who could actually help me out. My brother had had little more experience than I; and writing a letter to a distant department was not much comfort.

Well, winter came at last. On the first cold day, when the bees had subsided I picked up the hives and carried them off to a corner sheltered by apple trees, so that their flight line would not be directly over the lawn. Before another swarming season I successfully introduced Italian queens. There were far fewer bees to search over and those were improved in temper. Never, never will I advise a simple minded beginner in bee-keeping to re-queen a colony of hybrid bees in late summer. Do it in the spring. Then you can work with ease and confidence. It were better to lose some honey than every ounce of courage and all love for bee-keeping.

There have been many recommendations regarding the kind of garb a girl should wear. I acknowledge the men with trousers have a decided advantage in some ways, but nevertheless I am not going to follow suit. I have found that with clipped queens there is no climbing of trees or ladders, nor do any circumstances ordinarily arise where skirts are really dangerous. There is a possibility of bees climbing up, and some women have spoken of being decidedly annoyed that way. That has troubled me very little chiefly because I make sure they never have the opportunity. I make it a practice not to walk or stand at the front of the hive, at least without making sure, there are no stray bees just under me. Then when operating I either sit or kneel with skirts well spread out.

My preference is for a dress of white with skirt long enough to meet high topped shoes. White is the coolest material possible and also it does not attract the bees as does a thick dark goods. It seems strange that while they sense one's vulnerable spots around hands and ankles, they seldom attempt to sting the body itself. I have noticed that it is perfectly safe to wear a waist of the thinnest, sheerest material while at the same time it may be necessary for comfort to use gloves. My gloves are of the 10 cent cotton variety, with long muslin uppers. At first these were dipped in linseed oil to make them absolutely bee-proof, but I do not mind now. I have become sufficiently inoculated, that a sting means not more than half an hour of discomfort—at first my arms would swell and throb so that sleep would be impossible for two nights. I use a wire veil. I have never known a bee to get inside, the wind does not disturb it, and it does not tear on rose thorns or trees.

I do not advise the large sized hives, now so popular among professional bee-keepers. The time of year when the necessity for moving the hives is most liable to occur is at swarming season, when the weight is probably the greatest and the ordinary person is so fearful of stings that assistance is always difficult to secure. The eight-frame hive weighs fifty pounds and over when full, and is quite heavy enough to handle.

A word of warning should be given lest an over-zealous parent or grown-up

should force the subject of bee-keeping on an unwilling child. We are not all built alike, and take our pleasures differently. Not long ago an anxious father came to me for bees for his boy. The father was a busy city man, but delighted in out door occupations, in the study of birds, flowers and trees, and wanted his son to be a farmer. The boy loved electricity, wireless telegraphy, was determined to be a mechanic in some form and hated the idea of a farm. To have encouraged bee-keeping under such conditions would have been a positive crime.

I have spoken of the advantages of bees as a hobby but there are other things that will come from an intimate association with them besides a mere study of animal life or a possible financial gain: gentleness of touch, a quiet manner, self control, a keen sense of observation, a *deeper, broader* knowledge that will give a more sympathetic understanding of all the wonders of our universe.

The next subject was "Marketing Honey," and was discussed by F. J. Strittmatter.

Marketing Honey.

I believe if bee-keepers generally would take better care of the home market it would be the biggest help possible in the sale of honey. Of course this may not be practical in many cases for special reasons but in the East at least nearly all the honey produced could be sold comparatively near home.

In many cases a bee-keeper can to good advantage sell the crops of several others along with his own in the winter season when he may not be so very busy otherwise. The above is not a new suggestion but I believe will bear being repeated occasionally.

No matter what method you use the first thing in importance is QUALITY. Never be satisfied with anything short of the best. We all have some small lots of honey most seasons which are not up to the standard and such lots should be sold to the baking trade or if the quantity is not too large made into vinegar, the quality of which many prefer to cider vinegar. In fact we prefer it very much in our own family. The difference is in flavor and a matter of taste as either honey vinegar or cider vinegar if properly made seem to have the same keeping quality so far as we have noticed.

The best way to sell a small amount of honey in most cases at least is to make a personal canvass of near by towns and sell to private families direct. I would go ahead and take orders in buckets or whatever packages you can sell and then set a time for delivery making such delivery soon after the next general pay day. We sold in this way from six to eight tons of honey per year for a while, the writer doing about all the selling personally and hiring a driver to help deliver as we then delivered all by team.

In my experience I found that I could sell more honey in any near by town by canvassing from house to house twice a year than all the stores in town could sell by having it in stock all the year. But this canvassing and getting acquainted with the consumers led to a growing demand for our honey from stores also where we had put in and as this wholesale trade grew we gradually drifted to the almost exclusive wholesale method of selling and we now sell about ninety per cent. of our honey to the grocery trade selling and shipping direct to retail stores. Our sales this season to date run about twenty tons wholesale and about or a little over one ton retail mostly by parcel post.

I will say that we were able to make about as much money retailing six to eight tons however as we now make wholesaling twenty tons but the retail canvassing got monotonous to me. It was too much of the same thing day after day while the wholesale suits me personally better.

If you retail your honey it is not so very particular what kind of packages you use so long as they are neat but if you select packages that will be useful for other purposes and especially if your name is on the package it will prove an advertisement for you.

If you use plain tin buckets you will want to label them and we do not know of any ready made paste that will hold on tin. We tried everything we could get hold of including flour paste made cold and by boiling and would actually find some of the labels lying on the floor a day or two after they were put on the buckets till we tried dextrine mixed up with vinegar and a small bit of honey added. This will not spoil if properly made and will hold. If you use too much honey the label will have an oily appearance and if not enough they may not stick.

In selling honey as well as in many other lines of business satisfied customers are your best advertisement and we always make it a rule to guarantee satisfaction and while there may be an odd customer who will take an advantage of you in this the loss is not large on this score and it pays.

If you sell to the grocery trade it is doubly important to have nice packages and neat labels as the looks of the goods are about half the sale especially with new customers. We find that in most cases glass packages sell much the best in stores and in many stores they do not seem to be able to sell anything to retail over twenty-five cents and some sell most ten cent size.

Preparing for market.—If you sell honey wholesale it is important that it will not granulate soon. The way we prepare is first heat the honey in the sixty pound cans till it is all melted then strain into a tank made the same as a honey extractor tank, ours holds about 600 pounds, and then draw off into jars and when these are filled they are placed in hot water and heated to about 150 degrees for an hour then taken out and labeled and sent on to market. In this way the honey seldom granulates in much less than a year.

When we fill buckets we make the honey a little hotter in the sixty pound cans and keep it hot a little longer then strain into the large tank as before and fill into the buckets hot and seal. If you use plain buckets you could set them in water also but as we now use lithographed buckets we do not want to set these in hot water as the water destroys the gloss of the buckets somewhat. If you fill honey into jars or buckets cold it will granulate very soon and likely stick on the grocers shelves and in this case it will be hard to sell him again.

We consider steam the best and most convenient heat to use in the honey melting business. Just have a radiator made up of steam pipes in the bottom of your melting tank and fill the water then turn on the steam till the proper temperature is reached. We do not turn any live steam into the water but merely heat by the hot pipes.

With our equipment one man can handle about 500 pounds per day from the granulated honey in 60 pound cans to jars of average sizes ready to label.

In some of the above statements I might mention that they are based on handling honey from other apiaries as our own crop has not been enough for our sales even when retailing.

One thing also which I think is of considerable importance is to have your honey for the entire season to run nearly even in color and flavor and if you buy honey it will in most cases be necessary to mix or blend the different lots. This can be done so easily that there is not much excuse for running the different grades at different times, etc. Of course if you have some buckwheat honey this should in most cases at least be run as a separate grade. We use a simple reel in our filling tanks to mix the honey. Just heat so many cans of each lot and empty all together into the tank then stir thoroughly and leave stand an hour to let the air or foam rise to the top and fill into jars or buckets for market.

I might add that buckwheat honey will not stand as much heat as clover and we use about ten degrees less heat for this than we do for the light.

F. J. STRITTMATTER.

Some one wanted to know how to make honey vinegar. Mr. Buseman answered by saying: Take one quart of honey to one gallon of water. That will make a vinegar that is strong. If not desired so strong, take less honey.

Prof. Geo. F. Demuth, Apicultural Assistant in the Bureau of Entomology, Washington, D. C., was then introduced and spoke on, "The Importance of Preparation in Bee-Keeping."

The Importance of Preparation in Bee-Keeping.

By Geo. S. Demuth, Agricultural Assistant, Bureau of Entomology.

The business of honey-production seemingly consists of caring for innumerable details, each of which to be effective must receive attention at exactly the right time. The beginner is always overwhelmed by this great mass of details, and even some who are more advanced in the work may occasionally lose their way temporarily in the struggle with the many little things that make up bee-keeping.

It is well, when struggling through such a maze of details to look up occasionally to get a more definite idea of the purpose of, each of the details of our season's work, in order that we may weigh them and thus find their relative value as bearing upon the ultimate purpose of all our manipulations. When we can see each of these details in its relation to all the others and can trace out just what part each one plays toward the ultimate purpose of the bee-keeper, we shall probably revise our conception of the relative importance of the many things we attempt to do in the apiary.

Two phases of the work.—When examined with this in view, we find that each and every one of the multitude of things which we attempt to do during the year's work among the bees falls under one or the other of two great groups of activities. First we have one group of manipulations scattered throughout the greater portion of the year, each of which bears directly or indirectly upon a single purpose—to have, at the beginning of the main honey-flow, all colonies strong in energetic workers of a good strain.

Strong colonies at just the right time, however, do not alone insure the best results in honey that the location and season may afford, since strong colonies may divide themselves by swarming into two or more medium or weak colonies, thus defeating to a great extent the purpose toward which the bee-keeper has directed his efforts during almost a year of preparation. Even if a division of the working force is prevented during this critical period—the honey-flow—other conditions such as lack of suitable storage space for incoming nectar, crowded brood-chamber or insufficient ventilation, may cause the workers to loaf during the height of the honey-flow and in this way defeat the purpose of the bee-keeper. The second great group of manipulations of the apiary, therefore, includes all those having for their purpose the providing of conditions tending to hold the gathering and storing instinct of the bees dominated and the prevention of a division of the working force of the colonies during the main honey-flow.

With a given equipment in a given locality during a given season, the resulting honey-crop is determined by the degree of thoroughness and promptness with which these two things are done. Any manipulation which does not bear directly or remotely upon one or the other of these two purposes is something aside from honey-production while those manipulations affecting to the greatest degree these two purposes are obviously of greatest importance.

Briefly stated, then, honey-production consists of doing two things, first, providing workers of good strain for the harvest and, second, using these workers to advantage during the harvest. The dividing line between these two phases is most clearly defined in localities having a single short honey-flow from which all or practically all the surplus honey is secured.

The preparation period.—It is my purpose to confine my remarks to the first of these two grand divisions of the work of honey-production—providing conditions which result in strong colonies at the beginning of the honey-flow. In doing so, I am not unmindful of the more tempting array of material in the other group which has to do with the greatest activity of the season, around which is centered the greater portion of our enthusiasm in bee-keeping. Neither would I have you infer that these more interesting things are of secondary importance in honey-production. They form, in fact, the superstructure and to most of us are the very essence of bee-keeping. But the first group is the foundation without which the superstructure can not exist.

The tendency to neglect details of the lowly foundation while enjoying the structure above is a sufficient reason for a careful consideration of those factors which constitute the foundation of the honey-crop.

Interest.—You are well aware of the fact that our interest in the activities of the honey bees, especially during this one happy and busy month—the honey-flow—, is the chief stimulus that impels us to do our part of the work and that the promptness and thoroughness with which we do it is largely determined by the

intensity of this interest. The bee-keeper, during a good honey-flow when the bees are crowding him mercilessly, works from early morning until far into the night and knows no fatigue until he relaxes for his night's rest. Even then the night instead of appealing to him as a time for rest, seems only to be another obstacle thrown in the way to prevent the doing of the many things in which he is so tremendously interested. At such times, the bee-keeper needs no other stimulation to better effort for his intoxication is then complete. It is fortunate for the industry that bee-keeping furnishes, at least at long intervals, such a tremendous stimulus, but as in the case with other powerful stimulants the relapse between times is the dangerous corollary. At the close of the honey-flow, bees and bee-keepers slow down at the same time and the intensity of interest at other seasons seems to be inversely as the square of the distance (in time units) from the honey-flow or peak of the season. This slump of interest in the bees that comes with the cessation of the honey-flow and the radical transfer of activities from the apiary to the honey-house and to the market, often works greatly to the disadvantage of the bee-keeper. It sometimes even results in many colonies being permitted to approach the verge of starvation after the honey-crop has been removed from the hives. In such colonies brood-rearing is suspended during the time when eggs should be laid to produce bees that make up the winter colony.

In addition to the seasonal fluctuation of the intensity of interest, there is the sagging of interest during poor seasons. After a series of poor and indifferent seasons, the bee-keeper's interest may sag so low that when a good season occurs he is not prepared to take advantage of the opportunity. This is the basis for the saying among bee-keepers that the best seasons usually "catch" them with the poorest preparation in number and strength of colonies.

Bee-keeping is a peculiar industry in that the real business of the apiary, actual honey production, is confined to but a few weeks of the entire year while the preparation for this supreme effort is scattered throughout the remaining ten or eleven months. In much of this preparation, there is considerable latitude as to the time for any particular manipulation and the limit of time beyond which the manipulation is no longer effective is not always clearly defined. In addition to this there is an annual shifting of these limits and some seasons are so favorable that the colonies need but little if any help from the bee-keeper from the close of the main honey-flow of one season to the beginning of the next. In other words, the bees are so nearly able to take care of themselves during the entire non-producing portion of the year that there is danger that the bee-keeper will depend too much upon their ability to do so.

One is led to wonder how many would succeed in other lines of business if conditions were similar to that of bee-keeping. What would become of the merchant, for instance, if his business for the year were crowded into a single month and he had the other eleven months in which leisurely to prepare for the one month of business? Or what would happen to the milk-production of the country if the cows should give down the year's supply of milk within a single month and their care during the remaining eleven months of the year were for the purpose of fitting them for this one month's effort? The successful merchants and dairymen under these supposed conditions certainly would at least make a careful study of and make provisions to meet every possible emergency that might arise during the eleven months of preparation that could in any way affect the results during the all-important one month.

Fruit and vegetable growing are more nearly comparable to bee-keeping in this respect, but in these industries, insect pests, fungus diseases or weeds compel strict attention to details during certain definite periods of time. This results in the working out of a system which reduces the chance of omission of any important factor in the season's work. On the other hand, bees have but few enemies and require but little attention during the non-producing period.

The difference between the highly successful and the less successful bee-keeper is probably not so much in the greater skill of the one as in the greater degree of interest sustained during the ten or eleven months of non-production for, if the interest is sustained, skill will be developed. The intense interest and enthusiasm of the bee-keeper during the honey-flow can not retrieve a situation lost during the period of preparation. If bees to gather and store the crop are not present in great numbers and ready for business when the honey-flow comes, no highly refined methods or complex apparatus can take their place. One of the great needs of the industry is, therefore, some stimulus to sustain the bee-keeper's interest and thus induce him to systematize and simplify his manipulations during the eleven months of preparation.

Three Periods in the Preparation.

It is my purpose to call attention to the few essential things to be done during the ten or eleven months of preparation for the honey-flow and to suggest the advisability of working out some system by which none of them shall be omitted. In harmony with the type of location represented by the greater portion of your state, I shall assume conditions as usually found in the white-clover region, with but one major honey-flow. An analysis of the requirements of a colony of bees from the close of the honey-flow of one year until the beginning of the honey-flow of the next, on the basis of purpose on the part of the bee-keeper, reveals three well defined periods.

I. Production of Bees for the Winter Colony.

There is a date some time during the latter part of summer which marks the dividing line in brood-rearing between that brood, the resulting bees of which die before or early in winter, and that which results in bees that make up the winter colony. This date of course varies in various localities and with different seasons in the same locality and is greatly influenced by conditions governing the amount of energy that the bees expend before winter begins. In order to have a colony for winter, therefore, there must be some brood-rearing after this date. Thousands of colonies are lost annually because brood-rearing was not sufficient to replace the wastage of bee-life during late summer and early fall. Since we can not lose in winter colonies which we did not have the previous fall, it is an error to charge such losses to wintering. The workers that make up the colony at the beginning of the broodless period must be young and vigorous either in the sense of their age in days or in the amount of energy they have already expended, or in both.

The central idea, therefore, of this first course in the construction of the foundation for next season's honey-crop is the production of bees whose lives are to span the winter broodless period.

II. Conservation of Energy.

During the broodless period, the length of the life of the worker bees must be greatly prolonged if the colony survives. Instead of the accepted six weeks normal span of life under active conditions, the energy of the bees must be so conserved that they will live six months or more. The existence of the colony during the winter in the North, therefore, is dependent upon conditions enabling the bees to live slowly enough to last until more favorable weather conditions permit their replacement with young. The so-called spring loss or spring dwindling is usually properly speaking, a winter loss and the weakened condition in the spring of colonies that were normal in strength the previous fall must be charged to winter loss. The central idea in that which we call wintering is the conservation of the energy of the bees.

III. Increase in Population.

Some time in the spring, while still anxious that bee-energy shall not be wasted, the bee-keeper desires that it shall be spent judiciously in brood-rearing. Here, as during the previous period, the instincts of the bees are in harmony with the desire of the bee-keeper. From this time until the beginning of the honey-flow, the primary purpose of the bee-keeper is for a tremendous increase in the population of each colony so that it shall reach the possible maximum about the time the honey-flow begins, or, if there is sufficient time previous to the honey-flow as in localities where buckwheat furnishes the main crop, he may even increase the number of colonies, thus producing more workers for the harvest. This being the final lap in the preparation for the honey-flow, failures here are more noticeable, but not less destructive to profits, than are the failures during the other two periods and especially than are failures during the first period.

Three Fundamental Requirements.

During each of these periods numerous environmental factors, such as weather conditons or presence or absence of minor honey-flows, exert influences favorable or unfavorable to the ultimate purpose of the bee-keeper. In their battle against the many unfavorable conditions, there are but three fundamental requirements on the part of the bees—food, protection* and room for expansion during periods

*The term protection is here used in a broad sense, including protection from rain or snow, wind, extremes of temperature, robbers and from other enemies. It may be represented by the hive only or by the hive and winter packing case and wind-break or bee-cellar.

of greater activity. In other words, if a normal colony of bees is never permitted to run short of stores, if it is at all times well protected especially against extremes of temperature and if brood rearing is not at any time checked (when brood is desirable) by a lack of room, such a colony, barring accidents, will be prepared for the honey-flow in time to take advantage of it. The work of the bee-keeper, aside from providing or improving his equipment in bees, queens, combs and apparatus, consists only in supplying any deficiency that may occur in food, protection and room. These are but primitive facts in bee-keeping but they are basic and are exactly the factors to the neglect of which may be traced most of the failure to have colonies strong at the beginning of instead of at the close of the honey-flow. All the details of work, not concerned with equipment, during this entire period are concerned only with stores, protection or room for expansion of colony activity.

During the three periods into which the entire period of preparation is naturally divided, the emphasis on these fundamental requirements changes. Food, of course, is prominent as a requirement during each of the periods with additional emphasis on quality during the winter; protection has its greatest emphasis during the winter and early spring and room for the expansion of the brood-nest is primarily a spring requirement.

Food.

Fall food.—The most important of these requirements is food. A colony well supplied with stores at all times will stand a tremendous amount of abuse in the other two requirements. If an abundance of stores is present during late summer and early fall, brood-rearing does not cease, even during a dearth of nectar, but if stores are meager in quantity at this time, brood-rearing may be entirely suspended. It should be noted that, when there is no fall honey-flow, the winter colony must be reared in opposition to the instinct of the bees, which at this season is to rear but little brood during a dearth of nectar. If ample stores are not in the hives in August, they should be supplied without delay if the bee-keeper expects to have a colony in condition for winter.

Winter food.—During the winter not only quantity but quality of stores is important, especially if the bees do not have frequent flights. The practice of bee-keepers shows a decided tendency to supply in the fall not only enough stores for winter but also enough to carry the bees through the heavy brood-rearing period the next spring. Any deficiency in winter stores should be supplied not later than some time during October in this locality.

Spring food.—During the third period, the stores are being so rapidly converted into bees that there is danger that many colonies will run short and curtail brood-rearing just at the time when the bee-keeper can least afford it. I have seen many failures here and could cite tremendous losses even among experienced bee-keepers, resulting from a shortage of stores during the month of May. Unfavorable weather conditions often prevail during this period and the bee-keeper, thinking each day that the next will bring better weather and permit the bees to replenish their depleted stores from the fields, is easily led to wait just a few days too long. To purchase large quantities of sugar to tide over the period just before the honey-flow, when conditions may change even before he has had time to feed it, tests the metal of the bee-keeper. Too often he goes through such a period with a feeling of security and does not appreciate the situation until after the mischief has been done. To cite one illustration of what I mean here, I saw at one time during the latter part of May a series of six apiaries in which about ten per cent. of the colonies were actually starving and the entire lot of about 600 colonies was practically ruined for the season because the bee-keeper thought they could pull through without help. Here a 600-colony man waited just a few days too long before he began to feed. The honey-flow that followed was a 100-pound-per-colony flow, but his 600 colonies furnished an average of only about ten pounds per colony. This is but one of many such instances that have come under my observation, in addition to some exceedingly unpleasant recollections of similar personal experience which has helped to drive home this important lesson.

It is not a question of a supply of food in the hive merely sufficient to keep the colony alive during a period when nectar can not be obtained from the fields since long before there is actual starvation, brood-rearing is greatly reduced or even suspended and some of the immature young are carried out of the hive.

Protection.

Fall protection.—The protection afforded by the ordinary single-walled hive is usually sufficient during summer and early fall, since during that time the protection needed is largely protection against rain and cool nights or robbers and other enemies. In some locations shade is desirable during the hot days of summer to protect the colonies from extreme heat.

Winter protection.—It has been shown* that when the temperature of a colony of undisturbed broodless bees is above fifty-seven degrees F., and below about sixty-nine degrees F., the bees are quiet and their temperature drifts with the external temperature. A temperature of fifty-seven degrees F., and above is maintained within the cluster of bees throughout the winter. This temperature is maintained during cold weather by an insulating crust of bees on the outer surface of the cluster and heat-generation by muscular activity within the cluster. As the temperature of the air surrounding the cluster goes downward below fifty-seven degrees F., the activity of the bees within the cluster must be increased in order to maintain the required temperature of fifty-seven degrees F., and above within the cluster. This greater activity makes it necessary that the bees doing the work consume more stores to supply the source of the greater energy expended. More rapid consumption of stores results in a more rapid accumulation of feces, which the bees attempt to retain until a flight permits voiding them outside the hive. The presence of feces in large quantities acts as an irritant causing activity in addition to that required to maintain the necessary cluster temperature, thus greatly increasing the energy expended and stores consumed. This results in a constantly increasing accumulation of feces until the bees are relieved by a flight in the open air. Poorer grades of honey and especially honey-dew honey, when used in winter, result in a more rapid accumulation of feces for the amount of energy expended than do better grades of honey or sugar syrup. During the winter, therefore, except when the external temperature is between fifty-seven degrees F., to sixty-nine degrees F., bee energy is being expended in response to one or both of two irritants—cold and accumulated feces. Since to survive the winter the bees must live more slowly than they do during the summer, the problem of the bee-keeper during this period is the conservation of the energy of the bees, and he must seek the solution in two directions—that of better food if possible but chiefly that of protection against low temperatures, that is lower than fifty-seven degrees F.

This added protection may be supplied in the form of winter packing-cases or double-walled hives and a windbreak (outdoor wintering) or a winter repository (cellar wintering). In the light of the temperature requirement of the bees, the winter protection usually given is woefully inadequate.

Spring protection.—When brood-rearing begins, the temperature of that portion of the brood-nest occupied with brood is kept at a much higher temperature and later when there is brood in most of the combs the temperature of the entire brood-chamber is usually about ninety degrees F. Under these conditions thin-walled hives permit a rapid loss of heat when the outer temperature is low. For this reason the winter protection is usually left on the hives until late in the spring. Protection of the entrances against robbers is also important during this period.

Room for Expansion of Colony Activity.

Fall room.—The storage of food as well as brood-rearing comes in waves and usually at about the same time. If the hive is not large enough to contain the maximum of both at the same time, it may be necessary that the bee-keeper provide additional room during a minor honey-flow, either during the fall or spring. During late summer and early fall, if the hive is too small for both fall and winter stores and brood-rearing, feeding for winter is necessary if brood predominates and brood-rearing is abnormally reduced if honey predominates.

Winter room.—When brood-rearing space and storage space do not interfere, there is probably no advantage to be gained by an excess of room during the winter broodless period it may be advantageous even to reduce the size of the brood chamber to fit the colony.

Spring room.—During the heavy brood-rearing period of spring, the strongest

*Phillips, E. F., and Demuth, Geo. S., 1914. The temperature of the honey bee cluster in winter. Pp. 16, figs. 2.

colonies may need more room than that afforded by a single hive-body, and it is at this time that additional room is of great importance, because of the bearing it has upon the production of bees and swarming. The problem is usually solved either by adding an extra hive-body with empty combs or by expanding the brood chamber of the stronger colonies into unoccupied space of colonies less strong by what is known as equalizing the brood. This is done by exchanging combs of sealed brood from the stronger for empty combs from the weaker colonies.

Providing the Three Requirements in Advance.

It would seem that one of the greatest needs of the bee-keeping industry is some stimulation to a better system of supplying any deficiency in these three fundamental requirements early enough to prevent loss. There are two extremes of method in supplying these deficiencies. One is to watch the colonies daily in order promptly to detect their needs and then to supply each colony as the need develops. The other is to supply the three requirements if not already present for long periods in advance.

The former is the method usually used by the beginner. It involves a tremendous amount of labor and constant attendance in the apiary and is largely responsible for our conception of the complexity of bee-keeping. The latter method greatly simplifies the work, substitutes system for too frequent a lack of system and makes possible the operation of out-apiaries. It may, however, sometimes involve the giving of something that could have been omitted without loss. A fall honey-flow may take care of the food requirements of the colonies at that time and a large hive may furnish enough room for both incoming nectar and brood-rearing. A mild winter may make it seem to have been unnecessary to pack the hives so well or to have furnished shelter from the wind, and finally the maple, dandelion and fruit bloom may supply an abundance of food for brood-rearing during the spring. But we can not be sure of any of these things and can not afford to take any chances of the requirements being supplied in this way.

When food is given in advance, it is stored, not wasted, and remains in storage until needed. We can also give protection for winter and room for expansion the next spring just a little ahead of the time they are needed to be sure they will be there when needed. It is even possible as an emergency expedient, in localities having a single major honey-flow, to prepare every colony at the close of any given honey-flow for the entire period of preparation for the honey-flow the next year or a period of ten or eleven months. Most of us would be surprised on our return ten months later to find how well the bees have been able to take care of themselves without us, if they have an abundance of stores for every possible need, an abundance of protection against the most severe winter the locality may afford, and an abundance of room for expansion before the honey-flow the next spring.

There is a growing tendency among bee-keepers to use a shallow extracting-super, or hive-body filled with honey, above the regular brood-chamber throughout the year, except possibly during the honey-flow. Its presence throughout the interval between honey-flows, together with adequate winter protection, leaves little that the bee-keeper can do toward having the colonies strong in time for the honey-flow.

Bee-keepers, who are unwilling to invest so much at one time and who think of the investment as a form of unnecessary insurance, should mark off on the calendar four periods. In this locality, include in the first, roughly, the months of August and September and write over this portion of the calendar in big letters "*Produce bees for winter.* A normal colony with a good queen needs *stores* and *room.*" In the second period, put roughly, October to March, inclusive. On this part of the calendar write "*Conserve the energy of the bees.* They need *stores* and *protection* in abundance." In the third period include April and May. Here write one big word "*Brood-rearing*" and the two watchwords "*Stores*" and "*Room.*" After having done this, write at the beginning of each of these periods the familiar and much abused phrase "*Do it now.*" If, then, one lives up to his calendar, he will be at least prepared for the fourth period—the honey-flow—with its many perplexing problems.

A number of questions were asked after the address.

Are some strains of Italian bees immune to European foul brood? The only way to cope successfully with the disease is to introduce Italian blood.

How many colonies can one man handle without help?

That depends on the man, also on circumstances and whether he runs for comb or extracted honey. Prof. Demuth thought one man if he was a hustler could handle 600 or 700 colonies. Rea said he and his brother handled 1,250 colonies in New Mexico, located in four yards.

Strittmatter said he put in one third of his time on 200 colonies and if he used all his time he could work 700 or 800 colonies.

What is the best method of stimulative feeding?

Honey in the frames. Next best is granulated sugar. The proper proportion is two parts of sugar to one of water and boiled ten or fifteen minutes.

Saturday Morning Session.

The meeting was called at 9 o'clock.

The Secretary-Treasurer's report was received and approved, and is as follows:

Receipts

Balance on hand,	$69 97	
One report sold,	60	
Membership dues,	83 00	
Total receipts,		$153 57

Expenditures

Expenses of secretary to Harrisburg meeting,	$6 73	
Subscription to *Review*,	3 00	
Photograph of Harrisburg meeting,	1 00	
Phone call,	26	
Printing programs, Philadelphia meeting,	8 37	
Expenses of secretary to Philadelphia meeting,	10 03	
Printing programs, Lancaster meeting,	4 56	
Envelopes,	80	
Postage,	5 32	
Total expenditures,		$40 07
Balance on hand,		$113 50

The President then asked for names of members for the auditing committee and the following were named: Huber, DuBree and Rea.

The President next asked the convention to name a nominating committee and Messrs. Shilling, Faucett, Hacker, Strittmatter and Kirk were named.

J. R. Rambo then gave a demonstration of "Queen Rearing." He showed how in a simple way the ordinary bee-keeper can raise queens to re-queen his apiary.

This was followed by a paper on the same subject by W. D. Sellers.

Queen Rearing.

By W. D. Sellers.

My subject "Queen Rearing" is important as well as interesting. I cannot express in words what I mean by the word interesting unless you yourself have raised queens, grafted them in their baby state from the cells—where their mother had placed them in egg form—to queen cells, then watched them grow, then seen them capped over, taken and placed in a nursery to see them hatch into white silky virgins, then with your own hands take them to the mating nuclei or colony that is in condition to receive a virgin and by chance happen to see her go out on her wedding trip and return to take up her life work in her home and then after the honey season is over count and look with pride at her beautiful sections of honey. Unless you have gone through all this you cannot grasp what I mean by an interesting subject. Before we go into the subject of queen rearing I am going to trespass a little on another subject and say, to raise queens you must have plenty of bees early and the only way to have these bees is to have plenty of stores. I use the double story ten-frame hive and would advise any person that don't know exactly what he wants, to adopt this hive as it may appear large to some it can be made smaller by taking out the side frames and replacing with dummies. This double set of combs to the hive may also seem an extra expense to many but my experience proves that it is just the thing that cuts expense. There is always a year now and the that your bees do not gather enough honey to see them through the winter and in cases of this kind that extra set of combs often pays for themselves many times. I claim and a good many more claim that no colony is complete without a double set of comb whether it is run for comb or extracted honey. The wintering question is greatly improved by wintering with double bodies. There are many ways of rearing queens and as I wish to talk to the novice I will not go into the method of raising queens in a wholesale way. To begin with you will need a few queen cell cups. These you can cut out of the old combs from which the old queen has hatched. You can also make some by cutting a stick of wood to fit this cup neatly and then take and melt some beeswax and dip your stick that you have made to fit the old cell about five-eighth-inch down into the wax and then a little less each time you dip. About seven to ten times is enough. You will now need royal jelly so that the bees accept the cells more readily and this can be obtained from a colony that is building queen cells. A cell that is about to be capped up is the one to select to take your royal jelly from. All cells must have a little royal jelly put into them before the larva is transferred as it acts as a bait so that the bees accept it readily. It also acts as food for the larva till the bees begin to feed it thus preventing a starving condition which dare not happen even if it is for one hour if we want fine large queens. The age of larva that is to be transferred is three days old or just large enough so you can see it. Great care must be taken in grafting the larva so that you do not injure it in any way. You may want to know what queen you ought to breed from. If you are breeding queens for yourself it does not matter whether they are pure Italians or not but if you breed for the trade they ought to be pure if you advertise them as such. You probably have a colony that has superseded itself year after year and always produced a crop of honey. This is the colony to breed from. I will now tell you how to fool a swarming colony. It will be taken for granted that you have a colony that you catch in preparation for swarming. You simply take out the larva that the bees are feeding letting in all the royal jelly and graft larva from your breeding queen into these cells. Of course your colony will swarm out the day that the first cells are capped or shortly thereafter. I myself never accept any stock that will swarm when I have gone to the trouble to give it plenty of room above. But in this case the swarming queen will have no blood ties with these young queens. You can also raise queens in a double story hive with an O. K. queen below by putting a queen-excluding board between the bodies and lifting a few frames of bees up into the upper story to start their desire to raise queens there. Two queens can be kept in a colony in this way by letting a virgin hatch in the upper story and then reverse the bodies to give the young queen a chance to fly out and mate. If you like extra strong colonies to go into winter quarters you can let these two queens raise bees till fall and then take out the queen excluder and let the queens fight it out among themselves. The most active queen will always come off victor. Superseding cell building are the best cells that can be raised. It may be hard to judge a superseding queen by some but they can be easily noticed by the starting of cells and noting that the old queen is laying rather scattered and not being near as active as she formally was. They seem to be in no hurry or fuss that a swarming colony shows but goes to work in a business-like way producing the finest queens that we possibly can produce. It may be best for me to state that great care must be taken in getting the bees off the cells when they are finished for the slightest jar kills the virgin grub in her cell. The bees can be smoked off the cells or brushed off with a bee brush or a handfull of grass. As some queen breeders say that you can take the cells from the bees on the twelveth day I always take them away on the fifth or sixth day as I can get twice as many cells from the same number of cell building colonies in this way. They claim

that the bees ought eat off the wax at the end of cell so that the virgin in eating herself out will have no trouble, but I find that I don't want, nor you would not want, a queen that has not the strength to eat her way out. I have them to eat a little here and a little there till they have the whole cell chewed up by the time they get out. After queens are capped up they only require heat to incubate them to life so that there are nursery frames made the same size as Lanstroth which holds a few dozen individual nursery cages. As all queens are rivals they must be hatched separate. The cells are thus put into the nursery frame and then set between frames of brood in the colony to hatch. A little feed in the form of x x x x sugar moistened with honey must be put in the bottom of the cages for feed for the virgins when they hatch as the bees sometimes fail to feed them when they hatch and then they starve to death. You will now want to know of a way to mate these queens cheaply as possible. You can make a small hive to hold two or more frames and then go to one of your colonies that can spare a frame of bees, brood and all being careful not to get the queen with them and then put them in your small hive, closing them in for twenty-four hours and then at the end of that time open them up and let them fly and then give them a virgin that has just hatched by simply dropping it on top of the frame. It should be mated and laying at the end of ten days if conditions are right. There are many other ways of forming mating nuclei but this one is the easiest and best for the beginners. If you have a double story hive you can mate three queens at a time by putting a queen-excluding board between the bodies and then dividing the upper story into three parts with a few frames of bees and brood in each part. There must be a small hole or entrance on the two sides and at the back end coloring each side and end different from the main entrance at the bottom at front.

The reason that I do not use the front of the upper story is that in a good many cases this queen goes down into the main entrance with the field bees and is then killed. It may be well for me to state that a colony that is in a state that it expects a virgin queen will accept a virgin that has just hatched very readily. As there are quite a few methods of introducing queens the most popular method is the candy method. The queen is introduced in the mailing cage with this method by simply putting the wire cloth part of cage down on top of frames over the cluster of bees and then there is a candy plug that keeps the bees from the queen which takes the bees about seventy-two hours to release and in the meantime the queen has acquired the colony scent. I may say right here that some instructions that go with queens say that you may look after the queen to see whether she has been safely introduced and I have found from experience that this is wrong and the queen at this time is not safely introduced and by the disturbance of opening the hive and smoking the bees, often causes the bees to ball the new queen and kill her if she is not freed. I usually wait ten days from the time I start to introduce. If your bees are robbing you will probably not succeed at all. Another way to introduce a laying queen is to take a piece of wire fly netting about ten inches by six inches and make a cage that you can push down into the comb so as the bees cannot crawl under its edges and take the cage that the queen came in let all the worker bees fly away and then catch the queen and put her under this cage and be sure to place the cage on the comb over hatching brood and honey all alone so that in twenty-four to thirty-six hours she has quite a few young bees with her and then by this time if the bees out side of cage have not eaten in to her, the cage can be lifted and let her go among the bees and watch her to see that the bees treat her kindly. If they do she can be counted introduced. If they appear hostile toward her repeat the operation. The facts here stated are mere facts gained from experience which has proven a success in this locality and may have to be modified to suit another locality.

L. K. Hostetter then spoke in "Getting Ready for a Honey-Flow."

Getting Ready for a Honey Flow.

The first step in getting bees ready for the honey-flow should be done the summer before hand, *i. e.*, getting each colony headed with a young vigorous queen. In running for extracted honey I find the best time to do this is just at the close of the honey-flow. I did this one year at my Millport yard and found that in this hatch of queens they were all extra good ones.

The next important step is to see to it that each colony has plenty of winter stores. If bees need feeding I find it is a good thing to give them about fifteen or twenty pounds of honey to every one hundred pounds of sugar.

The next and most important part is to have the bees well packed in winter cases, in which they are kept until about the middle of May. They should also be well protected against the prevailing winds.

If bees are prepared as stated above they will need no attention until fruit bloom is well on; then it would be good to examine the strongest colonies and give them more room if needed. At this time I go through all my colonies and clip the queens.

After fruit bloom we have about two or three weeks during which time the bees will not gather any honey. During this time it would be good to feed a little thin sugar syrup to stimulate brood rearing. Some might say "Wouldn't it be good to give the bees stimulation feeding during the month of August?" In answer I would say that I tried this several times and couldn't say for sure that it did much good.

Just one more point in "Getting ready for the honey flow," and that is to have all supers and hives ready when they are needed. So many bee-keepers wait until the honey flow is almost at hand, then they order their supplies, which to their disgust won't come and won't come until the honey flow is almost half over. Of course, by this time the bees take to swarming or loafing and the result is just about a half a crop of honey.

Dr. Demuth, assistant United States apiarist then spoke on "Wintering."

During the summer or winter season the normal life of the honey bees is about six weeks and the number of bees in the colony is kept up by the constant rearing of young.

During the winter brood rearing ceases and therefore if the bees lived only six weeks during this period no colonies could survive the winter.

The length of time a bee lives is determined by the amount of energy it expends. The bees may be compared with small electric dry cell batteries in this respect.

Under certain conditions the bees will live so slowly that they may live six months or more.

The temperature of air within the cluster of bees never goes below fifty-seven degrees Fahrenheit normally. This temperature is maintained during cold weather by muscular activity of bees within the cluster.

Anything the bee-keeper can do to assist the bees in maintaining this temperature, such as protection from cold wind and packing around the hive to prevent radiation of the heat, is highly beneficial.

"Spring Management" was then discussed by Jno. O. Buseman, after which the nominating committee reported.

They nominated the following list of officers for the ensuing year, 1916, who were elected by a unanimous vote of the convention.

President, Dr. H. A. Surface.

First Vice-President, Geo. H. Rea.

Second Vice-President, Mrs. Gertrude Weaver.

Third Vice-President, R. L. Coons.

Secretary and Treasurer, H. C. Klinger.

Members Agricultural Federation, E. A. Weimer, Lebanon; Dr. H. A. Surface; H. C. Klinger, Liverpool.

Delegates to the National Convention, Dr. Surface; alternate F. G. Fox.

SATURDAY AFTERNOON SESSION.

The meeting was called at 1:45 by the President.
Elmer J. Weaver. read as follows on "Wintering Bees."

Wintering Bees.

The wintering problem with me has usually been a problem indeed, and I have found from experience that when a colony winters successfully without dysentery, and too great loss of bees, only three factors are essential to success, a good queen, a heavy honey flow, and ideal weather during the honey flow.

Given the three latter conditions, however, and it is more than likely that even with indifferent wintering we may have as much surplus at least as the amount of sugar required to winter them the following season.

That method of management, however, would not put one in the automobile-owning class very rapidly, and as that seems to be the present ambition of many of us, the wintering problem should be given careful attention, and continuous effort to obtain better results unless—our success each season is uniform and about 99 per cent. plus.

While I do not wish to criticize the action of your committee on program, I cannot help but think, and express the thought, that the best interests of this Association would be forwarded had this subject been prepared for presentation, by some man of experience and observation with the faculty to impart his methods and results, with whom bee-keeping is a vocation, instead of an avocation, as it is with me.

Environment usually causes us serious winter losses, which different methods of management will not overcome. Being engaged in growing cut flowers in winter, we have for a number of years grown several houses of mignonette, whose bloom produces pollen very freely, and each bright warm day during the winter, and this winter we have had many of them, the bees enter the houses freely, and when they are fortunate enough to find their way out, carry heavy enough loads of pollen to the hive.

Many of them are not fortunate enough to get back, and the population of the hive is seriously depleted in this manner.

Several years ago we tried indoor wintering, hoping to overcome this loss, instead we only accentuated it, as the first warm day after removing them from the cellar, it appeared as though nearly every bee in the hives found their way into the greenhouses, and only about half found a way out. On the whole we find the loss less from this source when wintering outdoors, principally because they become accustomed to enter and leave the houses in the late fall, and by instinct retain their sense of location throughout the winter.

The ideas that have been advanced, and are being advanced continually, for perfect results in wintering, are many and varied, and where one has been following a rule that has been producing successful results, he were foolish indeed to drop it and try some other system—the advocate of which claims is the only way of unfailing success.

Some of these writers can put either their practices or their theories in such convincing manner that one who has not lost by letting go that which he knows is good, and trying that which is said to be better, is tempted to experiment.

This is as it should be, provided the new idea is treated as an experiment on a very small scale, as it is through careful experimenting, trying out new ideas, and suggestions that all human endeavor advances step by step, and prudence is much better than unbridled enthusiasm in adopting any new and untried—by you—method. There was a time when we were very enthusiastic about the bee business, considering it a short cut to ease and plenty. We read about everything written on the subject and tried nearly all methods outlined, usually on a liberal scale. That accounts for the advice just given, which is from unprofitable, personal experience.

Upon one occasion we had to feed pretty heavy in the fall, and neglected it till toward the end of October. We hunted up articles on the subject and found November 15th said to be not too late. Hot syrup with tartaric acid added, was recommended by some, while others said hot syrup and honey added.

We thought the acid cheaper. and as it was just as good, used it. By January 15th, 90 of the 100 colonies were dead, the remainder nearly so, and the syrup was crystallized solid. Of course we received "something just as good" for tartaric acid, but would have avoided an almost total loss had we experimented in moderation.

We have had excellent results by placing an extra body under the hive containing either empty or partly filled combs. Upon the top of the hive a queen excluding honey-board is placed, and on this a cushion of sawdust about three inches thick. This allows free upward ventilation, freeing us from dysentery or mouldy combs.

Our winter cases are made of galvanized iron, which allow about a two-inch space for packing all around the hive, with holes at the top to allow moisture to escape. At the entrance is a block, reducing it to five-sixteenths by four inches, with three small holes about the four-inch slot, each five-eighths inches in diameter; this being patterned after a similar block described and used by Mr. Holterman with excellent results.

This last season we were very busy and neglected our bees in regard to packing. They are now two-story deep with a heavy pad of newspaper on top of the excluder, and a thick cushion on the top of the paper, giving no side packing nor upward ventilation.

Each bright warm day they are flying strong and carrying in pollen, but how they will come through remains to be seen. We are not departing from a tried and satisfactory practice because we think this method will give better results, but as before stated, simply because we "thought" we were too busy to attend to it as on some former seasons, and neglected to reserve chaff while threshing. We have used leaves for this purpose, only to find them lacking in results and inferior to chaff, as apparently no matter how solid they were packed in the autumn, by spring they had settled somewhat, allowing an air space at the top where protection is most essential. Our cases are deep enough to allow six inches of chaff on top of the three-inch cushion previously mentioned. Upon several former occasions we have omitted the side packing, as this season, only to find that the results were practically the same as when used, from which experience I feel sure the statement cannot be successfully contradicted that of the different factors entering into successful wintering, packing at the sides two inches thick as we have been using it, is not the most important, as our results have been about the same, with and without packing outdoors, and in our house cellar where the temperature is not very uniform.

We find the fundamental essentials pertinent to success are: first, a young, vigorous queen of a good strain of honey gatherers; next, plenty of sealed stores, either honey you feel sure is of good quality, or syrup fed early enough to be properly stored, possibly inverted, and partly sealed; then forget them for a while.

Give them a chance to arrange their winter quarters to their own liking, the same as you either prefer to or try to arrange your own. Most of us would resent another's interference with our domestic order, and we can depend on it that the bees not only resent our interference late in the season, but are greatly injured by it as well.

If you practice using sealed covers they should have the opportunity to seal them up tight before the weather turns too cool for them to do a good job.

If I were keeping bees on a large scale as a business, I would certainly try out the winter cases large enough to hold four colonies as used by Holterman, and recently illustrated in *Gleanings*, as tried out by the Root Company at Medina.

These cases would be expensive and somewhat unwieldy, but if constructed so they can be taken apart for summer storage they would not occupy so much space. One objection (though in actual practice it may not prove an objection) I should think would be placing two of the entrances either west or north. Nearly all of our cold prevailing winds are from those two points or half-way between, and one would think that even were the entrance very small, a cold wind blowing directly into it at high velocity, from 48 to 60 hours, without abatement, could not help but prove injurious.

Summed up, our experience has been: young queens, plenty of good stores, no interference late in the season, reasonable protection or none at all on sides, small entrance, upward ventilation, and heavy protection on top. About six inches of chaff on top of the three-inch sawdust cushion mentioned earlier, will give us as

good results as we can expect while we persist in the attempt to mix bees and mignonette, which appears about as easy as mixing oil and water.

Being like 99 99-100 per cent. of our fellowmen, mercenary through necessity, we are likely to have the mignonette, as it brings in a satisfactory revenue each season, while occasionally the bees do not. Were we situated like the remaining 1-100 per cent., and were mercenary only from choice, we would give them uninterrupted fighting chance.

ELMER J. WEAVER, *Ronks, Pa.*

The next address was on a subject which proves to be the greatest hindrance to the industry in the State.

Box Hive Bee-Keeping.

Our Greatest Bee-Keeping Problem and How to Help Solve It.

By George H. Rea.

Box hive bee-keeping, as practiced by the average farmer and back lot bee-keeper, is a serious menace to the whole industry. This no one will deny, especially since foul brood has become so widespread. The box hive will not admit of any manipulations of any sort. The owner knows nothing of the inside conditions of his colonies and in many cases cares less. When foul brood comes his way, his bees become polluted with it and rapidly die out. He knows nothing of the real cause but blames it on bad luck or the worms or something else than the real cause. This kind of bee-keeping presents every inducement for the rapid spread of foul brood. Hives in which the bees have died are left standing for other bees to clean out and the combs to be destroyed by moth. Our greatest present danger is the foul brood phase of this question.

In the fall many colonies are "taken up" or sulphured, the old hive daubed with honey and the combs containing brood and a little honey are scattered about for robbers to clean up. Often the ones killed are those that are too light to winter because diseased. Thus the disease may be scattered all over the surrounding country.

The box hive bee-keeper is constantly losing more than he makes out of his bees. No matter how willing he may be to make the most out of them, he is unable to produce results that will in any way compare with the results obtained from good bees, kept in good hives and operated by a man of modern methods.

From an economical standpoint alone, box hive bee-keeping is a losing game. Ignorance regarding bees and bee-keeping and oftentimes regarding many other things, is a necessary part of successful box hive bee-keeping. As far as the personal requirements of the box hive bee-keeper are concerned, real success is couched in one word, "*Swarms.*"

"That gum over there, he is a good one, he swarmed four times already and I took ten pounds of honey from him," is a familiar expression. Some of the most ridiculous superstitious beliefs and practices are found among bee-keepers of this class.

One lady, not far from Harrisburg, objected to having her bees inspected late in August, because she said the honey would have to be disturbed and to do so in the "Cat Days" would make it all sour, and she would lose her bees.

But that was mild in comparison to the fellow who was afraid lest the inspector would charm his bees and they would all follow him home. He stated seriously that he could say a few words that would cause his neighbors' bees to leave their hives and go over into his hives, all excepting the queen. A certain bee-keeper challenged him to do so but he said he was afraid some one would find out his secret or make trouble for him.

One good old German lady solemnly told me that her bees had all died because no member of the family thought to rap on the hives when her husband died.

Not very long ago a man lay on his stomach before his bee hives for the greater part of three days, impaling certain large bees on a sharp stick which he wielded. A passing neighbor called to him asking what he was doing. "Killing these infernal robbers. I guess they come over here from Smiths." Drones. Drones.

We are all familiar with the practice of drumming down swarms. I know one fellow who has a large circular saw suspended on a wire, for this purpose alone. He uses a plow share for a hammer and when his bees swarm makes a racket that may be heard a mile.

Well, that is a harmless pastime perhaps, and serves to amuse and entertain the neighbors.

In the discussion of this subject, I believe that we are safe in dividing box hive bee-keepers into four general classes:

1. Those who know something of the importance of better bee-keeping, and who are ready and willing to transfer their bees and to coöperate in constructive work along this line. They are usually much interested in securing literature on the subject and with a little encouragement become good bee-keepers. I believe that fully seventy-five per cent. of the farmers and back-lotters who now keep a few bees in the old-fashioned way belong to this class.

2. We have the fellow who enthusiastically informs us that his bees are all in modern hives and all pure Italian. He got two swarms and ten pounds of honey from each hive last year, and he expects to have one thousand colonies some day, etc., etc., too numerous to mention. Does he read a bee journal? Oh, yes! he had a *Bee Gleanings* one time. But then his ideas of bee-keeping are so magnified that he scorns the bee journals, and then he has no time to read anyway. We usually find his bees among weeds so tall that the poor things have to crawl three feet to the top of them in order to see daylight. And such bees! They meet us on the far side of a ten-acre lot with a welcome that reminds us somewhat of the disposition of the booze gang the next morning after a dry election. Pure Italians, whew! The hives were made in a factory all right, but we find the combs so criss-crossed that not a single one can be removed without cutting it or splitting the hive with an ax. This is far worse than any plain box hive. Any such hive, whether factory-made or home-made, must necessarily put its owner in the box hive class.

3. Those who are discouraged because their bees are not doing well and they don't care to do anything about it because the bees don't mean anything to them. Fortunately this class do not stay in the business long. If their bees do not soon die they may be persuaded to sell them cheaply or to give them to some one who does care.

4. Fortunately this class is small. The bee-keeper who belongs to this class is a sort of a combination of the other three with some things added. He knows that he is behind the times and a menace to good bee-keeping and yet takes a grim satisfaction in the knowledge. He knows that he is getting practically nothing out of his bees but he wants no instructions as to how he may do better. He is suspicious if not openly defiant toward the inspector and sullenly wants to be let alone. He wants no one, not even the State, to presume upon what he calls his rights, and yet he seems to have no realization of the menace that he may be to the general good of bee-keeping nor his obligation thereto. This class of bee-keepers must eventually get the moral 'suasion that is coming to them.

Some prosperous, up-to-date and wide-awake bee-keepers advise us to let the box hive man with his slipshod methods alone. They admit that the worst enemy to the honey bee and to good bee-keeping is the box hive bee-keeper, but they say that foul brood is a blessing to the one who knows how to handle it because it soon cleans out the other fellow once it gets into a community.

But is that strictly true? Do real facts bear that statement out? And even if it were so is that the proper attitude for us to bear toward our fellows? As a matter of fact we usually find that a scourge of foul brood hits the specialist so hard that he might well afford to get out among his neighbors and do considerable educational work in order to save himself much loss and expense.

It has already been said that if we encourage the small bee-keeper we will soon overstock our territory as well as cause an over-production of honey. Why, one fellow last summer threw up his hands in dismay and said to me, "What are we going to do with all the honey when you fellows get all these farmer bee-keepers educated to modern methods?"

Well, if it were possible to accomplish such glorious results, it would take so long that we would be listening to Gabriel's trumpet resounding down the valleys and over the mountains, and the honey market would collapse with a crash anyway. With probably not over one per cent. of the people of this country eating honey, the idea that there is a possibility of producing too much honey has no good ground for fact. If all the honey now produced were properly distributed there would hardly be a taste for each one.

The man who can deliberately say, "Let my neighbor's bees die with foul brood and by adverse conditions, I will be the gainer thereby," must be a selfish man

indeed. Such selfishness, if put into action in bee-keeping or any other phase of life, is sure to act as a deadly boomerang against the individual who is dominated by such motives.

What if all the farmers, all the fruit growers, all the dairy men, all the manufacturers and all the business men in all walks of life in all this country would manifest such a spirit? We may imagine the result but do not have space to discuss it now. That is the spirit that destroys men as well as business.

Now, let us look on the bright side of this problem. My neighbor farmer keeps a few bees. I show him how to transfer them, how to fight foul brood and get him interested in some good bee literature. I do not refuse to answer his questions nor to give him help when he asks for it, even though it may take my time and sometimes almost my patience. The next thing I know he is interested in planting honey producing forage plants. A boomerang of the right kind this time. Perhaps that is selfishness too, but if it is it works good to my neighbor as well as myself and it is worth more than gold to me to have my neighbor meet me with a smile. Men that used to be prejudiced against alsike clover because they said it did not produce enough hay to pay, now sow lots of it because they got some help and encouragement with their bees. That makes those locations much better for bee-keeping and really in a most direct manner it has made those men better farmers than they were. I get more honey from my neighbors' alsike fields than they do, and a good many barrels of satisfaction and fun out of it besides.

Only a few days ago one of my adjoining neighbors told me that he had purchased a few hives of bees and wanted to know about moving them. He had a very humble expression when he broached the subject. I suppose that he thought I would object to his moving them so close to me. He seemed somewhat surprised when I swept away his fears with a hearty, "Glad to hear it, John; call upon me for any assistance that I can give you." Now he has about eighty acres that I expect to see put in alsike if I help to make a success of his bee-keeping.

There is a place for the expert specialist in bee-keeping just as there is a place for him in growing fruit, potatoes, hogs, cattle or poultry. However, we must remember that the smaller producers of all these things contribute as much or even more to the prosperity of the Commonwealth, than does the specialist.

My observation is that practically every county in Pennsylvania should have at least one specialist owning several hundred colonies and making good profits. Such need not and should not interfere with the smaller bee-keeper, but in order to be most successful should coöperate with and help them. We need education, organization and coöperation along with our legislation, for the betterment of bee-keeping.

As mentioned earlier in this article, the farmer who is really encouraged to become interested in his bees and who begins to see something of real value in them, may become a better farmer than he formerly was because of a new interest in the planting of the legumes, which are at once our best forage crops, soil builders and nectar bearers. Along this line we must not overlook the importance of the honey bee as a fertilizing agent among fruit bloom. Since fruit is grown on practically every farm we surely can not and have no right to deny his right to keep a few bees for that purpose as well as for the many other profits of bee-keeping.

Bees are of such high economical importance that beyond a doubt the industry should be fostered among the farmers. Since this is true it is of the highest importance that the state and national governments shall provide the means necessary for the preservation of bee-keeping as an industry and necessary equipment in our various schools for the proper study of the subject. Slowly we are coming to this. Let us all do all that we can to thus bring about the elimination of the box hive and its attendant evils.

Dr. Surface then gave the closing address of the program on "Habits of the Honey Bee."

Some Habits of the Honey Bee.

By Prof. H. A. Surface, President Pennsylvania State Bee-Keepers' Association.

One of the greatest factors in successful bee-keeping is such an intimate knowledge of the habits of the honey bee that the operator can be able to take advantage of every difference of action under varying conditions to help bring about the results he desires. The person who well knows the habits of his bees can conduct his apiary for comb honey, for extracted, for queens, or for increase of bees, as he may wish, and not be obliged to follow any book or guide. When the "best book on bee-keeping" is written it will consist of many chapters on the details of the habits of the honey bee under varying conditions and seasons, and in different climates and countries, with a good chapter on modern equipment, and just here and there a little hint on bee management.

It is not necessary to take the time of experienced bee-keepers to mention the well known elements of bee habits, the kinds of bees in a hive, the different structures of queens, workers and drones, the differences in periods of development, the production of wax scales, the formation of comb or the many other elementary points mentioned in all good books on the subject.

It is impossible to take up only points that are new to all, or avoid mentioning some things that are quite familiar to many persons, but we shall call attention to some bee habits that bee-keepers may well bear in mind at times.

The Queen: As the queen is by far the most important bee in the colony, we commence with her. She is the only bee for which a new cell is constructed for the larval growth of each individual. Her one function is to lay eggs, and this she sometimes does at the rate of thousands per day. She lays most eggs when there is a fair or abundant and constant nectar flow. (Hence the lesson in stimulative feeding for those who wish to build up strong colonies by feeding.) If unmated, or sometimes when very old, she lays only sterile or unfertilized eggs, from which only drones can hatch. Also, after an inquiry, as by pinching the abdomen, she may lay only drone-hatching eggs. In normal condition she controls the fertilization of the eggs she lays, as the spermatozoa or male fertilizing element is stored in a receptacle and is released to meet the ovum in the oviduct and effect the fertilization which produces a female bee (a queen or a worker), but if no sperm cell is released there is no fertilization of the ovum and only a male (or drone) is produced. The explanation of exclusive drone production by a very old queen is that the sperm cells have become exhausted, and the explanation of the laying of only drone eggs by an injured queen is that the anatomical mechanism (or its connection) which operates the release of the sperm cells has been injured. (Hence the necessity of picking up the queen only by the wing, legs, orthorax—and never by the abdomen.) She may live to be four or five years old, but she gradually becomes less vigorous, laying eggs at a reduced rate. (Hence the importance of re-queening at least once every two years.) Normally, there is but one laying queen in a hive, and she shows great antagonism against any intruder of her own kind, pouncing upon another queen in mortal combat. (Hence the necessity of being sure there is no queen in the hive before attempting to introduce another.) She has a long sharp sting, but she uses it only for royal battles, or fighting against another queen. (Hence she can be picked up in the fingers of the operator with perfect safety.) She is fed on food pre-digested by the workers and offered to her in the form of a thick milky fluid which some call "bee milk" or "royal jelly." (Hence workers and food for them should be kept with her when she is caged or removed from the hive.) She is very hardy, often being able to survive adverse conditions until nearly the last bee in the hive. (Hence, a live queen often remains with but a handful of bees, after most in the colony have died, and they can be increased to a full colony with proper management.)

There is a condition under which there may be two laying queens in the same colony. This is when the old queen commences to decline. A few queen cells will be constructed, a new queen reared and mated, and both live in harmony until the old one dies or disappears. This is called "superseding."

When bees swarm the old queen goes with the old or "primary" swarm, and the young queen or queens remain in the hive. She does not lead the swarm, nor is she the last from the hive, but the bees fly around her, go where she goes, and settle where she alights. She does not leave until there is a sealed queen cell—an evidence that the home colony will have a queen. (Hence, the presence of queen cells in the hive means preparations either for superseding or for swarming.)

When swarming takes place the bees seem to ''lose their senses'' in regards to their former bearings and hive, and if hived even near the old hive stand they will start to working and return to the new instead of the old; but if some bees from the swarm are put into a small vessel and whirled rapidly overhead then tossed into the air they ''come to themselves'' again and return to the old stand. (Hence, to learn which colony swarmed whirl some bees from the swarm cluster and see to what hive they return.)

A swarm never goes away without a queen. (Hence, clipping the wing of the queen keeps both the queen and swarm at home.) Bees sometimes, but rarely, seek a place to which to go before swarming, but when they swarm and cluster some bees (''scouts'') go in search of a suitable place for the colony to become established. Upon their return the cluster breaks, and away they go ''in a bee line'' for their new home. They may remain in the cluster only a few hours, or a day or two, or even (in rare cases) permanently, remaining and building comb. The writer has several times had swarms enter vacant hives, even coming from other apiaries or possibly from trees.

When a queen's wing is clipped the swarm comes out and clusters for a short time, then finding itself queenless returns to the hive, to emerge again the same day or possibly the next day also. In the meantime the clipped queen is tumbling about on the ground in front of the hive, or she may be surrounded by a very small cluster (about the size of a walnut) of her own bees. Hence it is evident that at the beginning of the swarming the clipped bee should be found and cared for.

When the primary swarm and queen go out there are several sealed queen cells left in the hive. Each of several of these may be surrounded and protected by a cluster of bees that remain loyal to their own respective virgin queen.

The first queen out of a cell at once starts on a tour of royal murder, gnawing into each queen cell near the base and killing the occupant. Should she meet another young queen emerging or outside the cell there is a battle to the finish, but where the occupant of a queen cell is protected by its own faithful cluster the first young queen passes on in terror, and soon goes out with some of the bees in a *secondary swarm.* This explains why a secondary swarm has a virgin queen, and why several ''after swarms'' (as the secondary swarms are called) may appear. The bees guarding the individual queen cells seem to get tired of the secession business after a time, or perhaps agree upon a ''black horse candidate'' for the queenship, or the imprisoned queens make a final break for liberty, as there may come a small after-swarm with several virgin queens, and this will then be the last one. This explains why a colony may ''swarm itself to death,'' and how this can be prevented, by making sure there is only one queen or queen cell left in the hive at the time of swarming.

Another fact that the queen wing-clippers should remember is that the primary swarm, after having been fooled around a few times by the queen that will not ''go along,'' may make another effort and this time depart for ''realms unknown.'' This is explained by the fact that this time they have not departed without a queen, neither has the old queen grown new wings and accompanied her retinue, but the development of a young queen and her presence in the swarm make this absconding possible.

Here is as good place as any to lay down the fundamental statement that *all swarming is due to the efforts of the bees to escape adverse conditions.* Attempts at preventing swarming by cutting out queen cells are like treating skin eruptions by external applications only. It is better to remove the cause, which means to give room and ventilation in time, and as a last resort remove queen cells, doing this before they are sealed.

DRONES: The drones are more important than usually considered. They are the fathers of the workers, and as such should come only from good stock. They are the poor fellows who have no father but do have a grandfather. They are produced only in times of affluence, and are killed by their own half-sisters or aunts when the income is reduced. Yet this is only in a queen-right colony. In one that is queenless the drones are permitted to live. Hence, to get drones for early spring breeding either feed stimulatively and strongly, or make a colony queenless before the summer nectar flow stops and carry them through the winter in this colony. They can be changed from one colony to another without any trouble, as the bees seem to regard them as harmless interlopers.

THE WORKERS: These are the products of fertilized eggs and full sisters to the queens, or the daughters of mated queens only. The same egg may produce a queen or a worker, according to the kind of food given by the nurses. During the

first three days the food for all larvæ or young bees is exactly the same. After that time those that are to develop into queens are continually fed abundantly on ''royal jelly'' only, while those that are to become workers (and also the drones), are fed on a decreasing proportion of ''bee milk'' or ''royal jelly'' and an increasing portion of honey and pollen or ''bee bread.'' Workers and drones will be reared in the same cells for many years, but these cells gradually become shallower and narrower by the deposits of old skins, and the bees reared in them become likewise smaller. Hence, the importance of completely cleaning up old combs occasionally by rendering, in order to have large, strong workers.

The young workers first become nurse bees, feeding the larvæ and the queen, and going to the field after a week to a month, owing to the size of the colony. The length of their life depends upon the duration of their wings. Hence, the importance of keeping down weeds and grass that would wear out the wings in passing through to the entrance of the hives. When a bee becomes older its hairs are worn off and it becomes black and shiny. Young bees are gray and hairy.

As they become worn, feeble or sick their sisters carry them from the hive and throw them away, repeating the process when they return. They sting bees from other colonies, but not their own. They unite in their attacks on drones to tear them to pieces, but a single strong worker carries away a weaker one. A strange queen is generally neither stung, torn nor carried away, but ''balled'' by the workers uniting in a tight ball (about the size of a walnut) around her, pressing and smothering her to death. They will not sting her unless separated by force. (Drop the ball into water and pick her out.) They recognize different queens by their different odors. Hence, the method of introducing by smoking or by daubing with honey to disguise or conceal her odor until they become accustomed to it. As soon as they become queenless they start to make queen cells around very young larvæ. They must be less than three days old to make queens, and as it takes all eggs three days to hatch, the colony should be queenless at least six days, and all cells removed, to make queens from select combs given them.

The auditing committee reported the Secretary-Treasurer's accounts correct.

The Committee on Resolution reported the following:

1. *Resolved,* That we tender a vote of thanks to the Lancaster Chamber of Commerce for the free use of their rooms and the very cordial welcome which they extended to us.

2. *Resolved,* That we thank the press of this city for so kindly permitting their reporters to be present at this meeting, and for the publicity which they have given to our deliberations and discussions.

3. *Resolved,* That we thank the local committee composed of L. B. Huber, E. S. Hacker, Samuel Gochenauer, Elmer J. Weaver, L. K. Hostetter and Joseph P. Kirk, for their efforts in making the arrangements for this meeting and for the accommodation of the attending bee-keepers.

4. That we appreciate the untiring efforts of our officers, those retiring and those continuing.

5. That we extend a vote of thanks to Dr. E. F. Phillips for permitting his first assistant, W. S. Demuth, to be with us, and we also thank Mr. Demuth for his excellent address of last evening.

6. That we bring every influence to bear on our newly-elected legislators toward securing a liberal appropriation for the carrying on of the apiary inspection work.

7. That we follow the suggestions made by Prof. Surface that every bee-keeper present take note of the things said at this meeting and have them printed from time to time in their local papers.

Inasmuch as it has not been chronicled, we desire to express our sincere sorrow and regret for the removal by death of our brother, D. S. Newall, of Philadelphia, and we express our heartfelt sympathy to his relatives and friends.

H. FAUCETT,
F. J. STRITTMATTER,
GEORGE H. REA.

A motion was made to hold the next annual meeting in Harrisburg and the time left to the wishes of the executive committee.

A series of summer meetings were arranged. L. B. Huber, Landisville; J. H. Kirk, Peach Bottom, and Dr. I. H. Mayer, of Willow Street, were selected as a committee from Lancaster County.

J. R. Rambo, of Collingdale, was appointed to arrange a summer meeting in Delaware County. F. J. Strittmatter, of Ebensburg, was selected to arrange a similar meeting in Cambria County, H. C. Klinger of Liverpool to do so in Juniata County, and Messrs. Irvin Chapin, Geo. F. Smohl and I. H. Corsen for Luzerne County.

A short time was devoted to general discussions on re-queening and increase after which the convention adjourned.

H. C. KLINGER, *Secretary.*

Report of the Thirteenth Annual Convention, Harrisburg, Pa., March 2-3, 1917.

The convention met in the Senate Caucus Room, Capitol building and was called to order at 2:30 P. M. by the President Dr. H. A. Surface. After prayer was offered the minutes were read and approved. Thirty members were present at the opening session.

The President then delivered the opening address and gave a history of the Association, of its early struggle, of what it has accomplished by way of legislation and compared the enthusiasm of its meetings with the lack of interest that marks the sessions of other similar organizations.

He also spoke of the great loss former State Inspector G. H. Rea met through the death of his wife. Mr. Rea is now doing extension work for the National Government in North Carolina.

A motion was offered that a letter of condolence be sent to Mr. Rea and that it be signed by all the members present.

A nomination committee was appointed consisting of Messrs. Weimer, Huber, DuBree, Gilham and Miss Brinton.

F. G. Fox then read a paper on "Gathered by the Way."

Gathered By the Way.

If I were to ask you what we gather by the way, I think you would reply experience. This is as it should be if we are awake and alert.

It seems to be that the best part of a bee convention is the exchanging of experiences, that each may profit by the other fellow's blunders or mistakes as well as his success.

There is a strong tendency to speak only of the success and cover up the blunders, but often the latter is more helpful to our fellow bee-keepers than the former, so why should we hide that which may be the more helpful. It is a commendable trait to enlarge upon the success and look upon the bright side of everything. For

Sure this world is full of trouble—
  I ain't said it ain't,
I have had enough and double
  Reason for complaint.
Rain an' storm have come to fret me,
  Skies were often gray;
Thorns an' brambles have beset me
  On the road—but say,
    Ain't it fine to-day!

What's the use of always weepin',
  Makin' trouble last?
What's the use of always keepin'
  Thinkin' of the past?
Each must have his tribulation,
  Water with his wine—
Life, it ain't no celebration,
  Troubles? I've had mine—
    But to-day is fine!

It's to-day that I am livin',
  Not a month ago:
Havin', losin', takin', givin',
  As time wills it so.
Yesterday a cloud of sorrow
  Fell across the way;
It may rain again to-morrow,
  It may rain—but, say,
    Ain't it fine to-day!

So it is only the present we are living in and not the past, or even the future. However, the past has its lessons whereby we may profit in the present or the future.

In my brief ramblings during the past season, the thing that struck me the most forcefully was the ignorance of people about bees. I have met both the man "who knew it all" and those willing and anxious to learn. To the former class you cannot impart much information, it is like pouring water on a duck's back. The latter it is both a pleasure to meet and assist.

The practical bee-keeper often finds himself in a position where he would like to have a few more bees to bolster up the winter's loss or to increase his honey production or both. While purchasing bees by the pound from the South is a very good method, I question whether there is not a cheaper and better way of procuring this increase. There are many farmers and others who have all the bees they care about and simply let the swarms suit their own sweet pleasure about a future home. When properly approached the people are often willing to sell these swarms for a small consideration. In fact, the cash they receive for the swarms is several times greater than the money they receive for the amount of honey they sell. As to price for the same, I consider one dollar a fair remuneration for a prime swarm early in the season. Sometimes they can be had for a smaller sum. One such swarm purchased in May stored for me over forty first-class sections of white comb honey and twenty pounds of extracted. Nine other swarms purchased gave me 120 sections fancy clover honey and 100 pounds of extracted. These were kept on the let alone system or I might have gotten fully 50 per cent. more honey from them. What these bees did in the fall I do not know, as I have not seen them since July.

Happy is the man who has all the bees he wants or can handle and does not want any increase. If he handles his bees properly, either by returning the swarms or hiving them double, he can produce about three times the average yield of honey. Even in a poor season these rousing colonies will produce some honey while other colonies are struggling for an existence. The secret is a tremendous field force and comparative small household expense.

My best colony the past season was a hived back and partly a double swarm which gave me 214 first-class sections of honey. At one time I run short of supers or I might have done some better. My average for the season was about 40 sections per colony.

During the heavy honey flow it pays to keep after the bees. Not only give them plenty of surplus room but have an eye on the brood nest. I have seen colonies the past season which had been strong at the beginning of the honey flow dwindle down to a very few bees and upon examination found the hive just blocked up with honey and no room for the queen to lay. In one such colony I could have covered all the brood with the palm of one hand. The queen was having a holiday but it did not last long, as I relieved the congested condition of the hive and gave her room to work. This was in a ten-frame hive.

Now a few words as to location of apiaries. I do not believe it is ever advisable to locate an apiary along comparative large streams of water or lakes. True, they look mighty picturesque, but that is all you can say for them. The bees will almost invariably cross the water and when they come homeward, heavily laden, they alight on the water to rest and as they are mighty poor ducks, they cannot get back in the air again and perish by the thousands.

One of my out-yards is in a sheltered spot on the banks of the Delaware. Early in the season it has built up more rapidly than my home yard, due to its sheltered location and the abundance of wild flowers, Indian tobacco, dandelion, black locust, and later basswood. But when the buckwheat flow comes on, they cross to the New Jersey side, load so full of nectar that they must needs stop and rest on their homeward way. As there is no island in their direct flight they alight in the water to arise no more.

About ten days after the buckwheat flow had begun I visited this yard. By a casual inspection of the outside conditions of the best colonies it looked as though they had cast a swarm about three days prior. Upon examining the interior it was very evident that they had not swarmed but about 80 per cent. of the field bees were missing. It did not take long to find out what had become of them. After the buckwheat flow the bees increased again and were in good condition for wintering. For several years it has puzzled me to know why this yard never did well during the buckwheat season and did not give any fall honey. The solution now is very plain and I think that yard will be moved after the linden flow.

There may be locations where the streams are narrow or so wide that the bees will not cross them, or the honey flow all on the side where the apiary is located. Under these conditions the location would be all right.

My home yard is about three-fourths of a mile from the Delaware and the river has never taken any noticeable toll from them. But conditions differ. I am about 300 feet above the river and the bees in crossing fly from hill to hill high above the river, if they must alight the chances are ten to one in their favor of making the opposite shore before they get down to the water.

There are some bee-keepers who are much better salesmen than others. They are able to sell much more honey than they can produce. Still, when they approach the other fellow and try to buy honey from him they are asked the top notch retail price and thus make it impossible to do business.

Those having honey for sale should consider what their honey would net them if shipped to the market. Of course, they would have to pay freight, cartage and commission, so the net returns would not look like the honey quotations.

I know it is a fact that the man who wishes to purchase honey for his trade can buy it from the commission houses for less money than they can from the producers. Question, What did the producer get for this honey when he sent it to the commission merchant?

The subject of "How to Increase," was then taken up by J. R. Rambo. He gave as an illustration that a neighbor of his had a strong colony and wanted increase. He made eight nuclei out of the colony and gave each a ripe cell. Of the young queens seven were successfully mated. Four of the nuclei gathered a total of 100 pounds of surplus honey and the other three thirty pounds. The queenless nucleus had to be fed and the parent colony also built up strong to winter. This would bring the income value of the colony to $40 or $50.

Question.—How strong were the nuclei? One frame of brood and honey and some shook bees.

Question.—What per cent. of bees go back? Not over ten per cent.

Question.—Should the entrance be closed? The nuclei were made at 4 P. M., and the entrance closed and then they were released at 7 P. M.

Penn G. Snyder of Porto Rico then was introduced and spoke on conditions existing in that island.

Porto Rico is a beautiful spot. The bees are as devilish as the land is beautiful. I never wore gloves in the States but when I came to Porto Rico I had to use them until I re-queened. All the native bees are cross—a mixture of Italians and black. The honey yield is different from that of the North. We have a flow ten months of the year, a slow and gradual continuation. The main crops are from the blossoms of trees. During 1915 we had five blossoming periods and in 1916 three periods. The honey is not as good a quality—a little sour and is not ripened as well.

The honey resources of the island are good. In ten years the amount of export of honey increased from $46.00 to $46,000.00.

The quantity taken from one colony was never known to be over 200 pounds. My average is 100 pounds. There is money to be made at 100 pounds per colony.

There is no winter problem and no foul brood. An individual can handle 1,000 colonies.

The laber of the island is performed differently from that of the North. All cutting is done by a sword-like knife called machete.

The peon uses it to cut a toothpick, cut a chicken's head off or to butcher.

The soil is not cultivated very deep and most of it is done by hand owing to its texture and composition. It is largely volcanic in formation and is of a gritty nature from a sand to rocks of the size of an egg. It is impossible to use a plow except on land that is flat. A plow is drawn by either from four to six oxen or six mules. The plow runs about four inches deep. On hillsides the hoeing is all done upwards.

All the humus cut off with the hoe is burned later on.

None is ever worked in the soil. How things grow is a mystery.

No fertilizers are used except when tobacco is raised. The natives do not understand enough to work humus into the soil.

It is necessary to re-queen every year on account of the failing of the queen. This is caused by her laying continuously during a whole year.

Question.—What is the temperature? From ninety to ninety-five during the day while the nights are cool.

Question.—What other insects? Not very many insects on account of the lizards which are very plentiful and are the people's best friends. They keep the insects down.

Question.—What is the market for honey? It is sent to New York.

Question.—Why will bees store honey if they have access to it in the flowers all the year round? Because it is instinctive. Dr. Phillips said that bees do sometimes lose their instinct. Darwin cites a case of bees losing their instinct through change of environment. Honey gathering is an instinct and we make a mistake by thinking it is intelligence. A bee has very little memory. It does not last over three days.

Mr. Carr of New Jersey concluded the discussion by speaking on the instinct of the bee.

A motion was made that the legislative committee be continued.

The following committees were appointed: Auditing, Rambo, Fox, and Reeder; Resolution, Hollopeter, Brant and Fisher.

Evening Session.

Dr. Surface in the chair. The question box was opened and questions answered by Mr. Buseman.

The nominating committee reported the following officers which were elected by acclamation:

President, Dr. H. A. Surface; 1st vice-pres., G. H. Rea; 2d vice-pres., J. R. Rambo; 3d vice-pres., F. J. Strittmatter; sec-treas., H. C. Klinger.

Members of Agriculture Federation: E. A. Weimer, H. A. Surface, and H. C. Klinger.

Delegate to National Convention, H. A. Surface; alternate, F. G. Fox.

The Foul Brood Inspectors, Messrs. Fox, and Rambo then reported of the work done during the year. They recommended that a law be passed making it a nuisance to keep bees in box hives.

E. G. Carr the State Inspector for New Jersey presented a paper on "The Alexander Treatment for Foul Brood."

The Alexander Treatment for European Foul Brood.

The treatment of European foul brood without destroying the combs according to the plan by Mr. Alexander, published in the November, 1905, number of *Gleanings in Bee Culture,* contains but one new feature which is the combination of Italian bees, queenlessness and strong colonies. All of these three things had been used with success by various apiculturists.

Notwithstanding the fact that the directions were plainly given, many failed to secure good results. Since some of the best bee-keepers in the country report success with the so-called Alexander method, failure, if any, must be attributed to the bee-keeper. At the same time, the behavior of European foul brood in different localities varies so much that more radical measures are necessary in some cases than in others.

There are three factors involved in the treatment for European foul brood without destroying the combs, which are, a strong colony, the cessation of brood rearing in the diseased combs for a time, and good Italian stock. The disease sometimes disappears from a colony with only two of these conditions present.

The Strong Colony.

Perhaps the most important factor in this method is a strong colony. Sometimes a colony infected with European foul brood is strong but in the manner the disease often works a colony is soon weakened if strong when attacked.

Too small a colony is often the cause for failure to overcome this disease by this modified treatment. No one who has not had the opportunity to note the different ideas among bee-keepers as to what constitutes a strong colony, can form an idea of this difference. So great is this that what one would call a strong colony another might consider only a nucleus.

To do the best work in cleaning up European foul brood a colony should be strong in *young* bees, since these are the ones which are credited with doing this work. Strengthening the colony should be done without unnecessary drain upon the strength of the other colonies. It is necessary, therefore, that the minimum strength of colony which may reasonably be expected to clean out disease, be known.

Both Dr. Miller and the Dadants have been successful in combating European foul brood by dequeening and they agree on the amount of brood and bees necessary for success. While the size of hive and frame used by each is different, they consider necessary an amount of brood about equal to five Langstroth size frames well filled, or about 500 square inches and enough bees to cover well six Langstroth size frames. Colonies which are not equal to this in strength may be strengthened in various ways. Frames of emerging brood may be added, frames of bees may be shaken before the entrance, colonies may be united, or weak and strong colonies may be made to exchange places. The plan which appeals to the writer most is shaking bees in front of the entrance. The old bees fly back home and the young ones go in the colonies needing them.

Dequeening.

A period of no breeding in the combs is necessary to give the bees opportunity to clean out the diseased larvæ. This checks the multiplication of the bacterium responsible for the disease by bringing on a dearth of suitable soil in which they may develop. Simmons, in 1904, recommended leaving the diseased colony queenless but did not give any definite time. Alexander, however, specified a period of 27 days during which no eggs are deposited in the hive. His idea was that it was necessary to allow all brood to emerge before the deposition of eggs was allowed.

Even the most casual observer has noticed the great difference in the inclination or ability of different colonies to clean out diseased larvæ. This may be accounted for by the greater or smaller number of young bees in the colony or by the difference in the race or strain of bees. However this may be, the economical man-

agement of the apiary demands that a colony be without a laying queen only so long as is necessary to accomplish a desired result.

Dr. Miller in applying this treatment made an error and gave a *laying queen* at the end of 21 days instead of a *ripe cell*, thus shortening the time of no egg production from 27 to 21 days. Probably encouraged by this reduction and realizing the great advantage of reducing the period of no egg production to the smallest possible time, he found by experiment that a break of ten days in egg production in some cases was sufficient to overcome the disease. The reduction in time is dependent largely upon the amount of infection. It is clearly seen then that to fix an arbitrary limit to the time of queenlessness would unnecessarily interfere with the work of some colonies.

Giving a Good Italian Queen.

This really means giving a queen whose offspring show disease resistant qualities. These qualities might be found in any race of bees, but Italians have shown this resistance to a high degree, therefore they are preferred.

Requeening is sometimes done with purchased queens and while they are sold for Italians and may be pure so far as the queen breeder knows, there has been so much crossing races for one reason or another that failure sometimes results when these queens are used.

Dr. Miller has secured good results by caging the reigning queen in the hive. Under like conditions which are exceedingly strong colonies, vigorous bees and a small amount of infection, any one may secure like results. This method appears questionable since it may be assumed that the bees in a colony which is attacked by foul brood have a susceptibility to disease which should be bred out. However, substituting a young queen reared from selected disease resisting stock must be beneficial.

Modifications of These Principles.

Instead of deposing or caging the reigning queen success is also had in combating this disease by causing the bees to construct a new brood-nest, thus bringing about a period of no brood rearing in the infected combs. There is no reason to expect success with this method unless there is a heavy honey flow at the time. The principle appears to be, the two or three days' break in egg-laying reduces the food for the baccillus, the honey flow furnishes an abundance of healthful food for the larvæ and gives a stimulus to the cell cleaners and the cells are quickly and thoroughly prepared for the incoming nectar.

In actual practice the queen is put in a hive with full sheets of foundation, over this an excluder, and the diseased combs over all.

The activity of bees in cleaning out European foul brood during a flow of nectar from buckwheat has often been remarked. This has been explained by the supposed presence of a large amount of acid in buckwheat nectar. Acting on this theory, some have fed a mild acid to diseased bees and reported good results.

Latham[1] in 1915 did much to bring this into prominence, although Cushman[2] suggested it in 1890.

Latham's plan is to give the infected colony a daily dose of lemonade. This is made of 10 ounces of sugar, the juice of one lemon and one-half pint of water. Since it is a recognized fact that a honey flow (either natural or artificial) often causes European foul brood to disapear, the effectiveness of the lemon juice has been questioned and it has been suggested that a daily feed of syrup would be equally effective.

To avoid the trouble of making the lemonade one bee-keeper has used an ounce of citric acid to a gallon of syrup and claims good results. Further testing is needed to prove the value of the acid treatment.

Exception has been taken to recommending the Alexander plan to all persons having bees, it being considered practical for advanced bee-keepers only. There may be some ground for this objection, but it is believed that anyone with sufficient skill and knowledge of bee-keeping to successfully treat a colony by the shaking plan will be equally successful with the dequeening method. E. G. CARR.

New Egypt, N. J., March 2, 1917.

Dr. E. F. Phillips of the Bureau of Entomology, Washington, D. C., was then introduced and addressed the meeting on "Extension Work in Bee-Keeping."

1. Latham, Allen, 1915. Gleanings in Bee Culture.
2. Cushman, Sam'l, 1890. Bulletin No. 9, R. I. Ex. Station.

Extension Work in Bee-Keeping.

Dr. E. F. Phillips.

Last December, while attending the semi-centennial celebration of the Michigan Bee-Keepers' Association at Grand Rapids, the after-dinner toasts seemed to offer opportunity for discussion of a topic somewhat out of the ordinary for a convention of bee-keepers. It seemed appropriate to give expression to an opinion concerning the ways in which bee-keeping is to advance. Bee-keepers all realize that it must advance. It was pointed out that past and present bee-keepers have toiled laboriously to get the information needed for their work and that the present methods of learning bee-keeping are too slow and too uncertain. Bee-keeping is often a sort of tradition handed down from one bee-keeper to his successor. There are the books on bee-keeping but most of such literature is not pedagogically correct. A few schools and colleges offer courses in bee-keeping but these reach relatively few. The bee journals are not edited primarily for the giving of the fundamentals of the business. The bulletins and circulars on bee-keeping from government offices do not reach enough people, nor are they the most effective method of presentation. The apiary inspection system is probably to-day the most efficient, extensive instrument for the teaching of bee-keeping, and this function is a mere side line of the work.

In the talks at the Michigan meeting last winter, it was prophesied that the present methods of instruction would be replaced by more efficient methods. Professional bee-keepers are not being made fast enough, and without an increase among the professionals bee-keeping cannot advance. A brief quotation will make clear one obstacle in this advancement: "Any bright boy ought to be able to learn the essentials of bee-keeping as practiced by our best bee-keepers in one year, or two years at most. A young man spends four years in medical college, gets a little hospital experience and possibly treats you when your life is in danger. Surely he has had to learn more in his brief preparation to care for a complex human organism than the bee-keeper has to know to produce honey."

If it is not considered out of place, another quotation may be given:

"The advances of past years in bee-keeping have come chiefly through an exchange of ideas and results through the journals and books on this subject and more recently by the distribution of bulletins from the Federal and State laboratories devoted to bee-keeping. It is now coming to be generally accepted that these educational agencies are not entirely sufficient and also that the industry is worthy of more recognition. Several agricultural colleges are now teaching bee-keeping and it is being included to a limited extent in the extension work of various institutions. If this work can be enlarged adequately there is a great future for the industry along commercial lines and it is to the interest of every person engaged in any branch of bee-keeping activities to further this development.

Everyone interested in any kind of instruction work in bee-keeping is aware that some bee-keepers disapprove any plan by which more persons may be induced to keep bees. Just as soon as such work is suggested, the ogres Overstocking and Overproduction are called in as allies of the objector. It is somewhat difficult at times to have patience with such objections but, since they persistently appear, it is desirable to consider them. It is frequently estimated that nine-tenths of the nectar dries up and is lost, for want of bees to collect it, but this estimate is probably made either from caution or from lack of information; it would be much nearer the truth to state that not more than one-twentieth is collected. Even where colonies of bees are abundant, is is usually easy to find places for new out-apiaries, and one who attempts to find a half dozen localities of any size in the United States that are now overstocked with bees will find his task virtually impossible.

Overproduction is an argument more difficult to answer, but it is becoming easier every day. Years ago, Moses Quinby, the Father of Practical Bee-keeping, could flood the New York honey market by shipping in less than 30,000 pounds of honey. To-day this causes amusement for hundreds of towns and small cities are consuming this amount of honey every year. It must be remembered that commercial bee-keeping is a young industry and the marketing of the crop is only in a formative stage. But the real answer to the objection of overproduction lies in the fact that it is rare for any honey to be held over until the next season and never in considerable amounts, while usually mid-winter finds the markets short of honey. This argument therefore need not deter anyone who is interested in advancing bee-keeping.

The real reason back of the objection to the making of more and better bee-keepers is, of course, selfishness If a bee-keeper finds that he can make a good living by bees, he may think that he can establish a monopoly on that in his community by keeping others ignorant of the business. This may be possible in a limited community, but it is not commendable in general and it is certainly short-sighted and narrow.

It is entirely possible, and in fact easy, to show the fallacies of such objectors, but there is one overwhelming argument against such views which ought forever to silence these critics. Bee-keeping has scarcely yet established itself definitely as an important branch of American agriculture. The present crops are inadequate to make honey a staple market article the year round and the number of commercial bee-keepers is inadequate to supply honey for the easily created demand. Therefore pride in the industry and a desire to make honey a staple and the demand for it more constant will induce every far-sighted bee-keeper to welcome every legitimate effort to build up the bee-keeping industry.

If it be granted that there must be more professional bee-keepers, from what source shall these be drawn? There must be recruits every year to the ranks of bee-keepers, but it seems clear that the best material from which to make professional bee-keepers is found among those already keeping bees. The effort is therefore, not so much for more but rather for better bee-keepers. The fact is that bee-keeping could become an important branch of agriculture with half the present number of bee-keepers, provided there were more specialists.

Among the agencies for this work, there is one which is the subject of this paper. Extension work in bee-keeping is not new, for in several states work of this character has been going on for several years. The special branch of this work which will be discussed is that of the Bureau of Entomology. The last session of Congress made an increase of $5,000 in the appropriation for the office of bee culture and, more important, changed the wording of the appropriation to permit demonstrations. Just as soon as this was made law, a Civil Service examination was called for apicultural assistants, which was given on September 20th. Appointments were made as soon as possible and three men are now in the field. No more field men can be appointed under present funds.

In North Carolina, Mr. George H. Rea, former inspector of apiaries in Pennsylvania, is working on a coöperative project between the Department of Agriculture, the North Carolina College of Agriculture and Mechanic Arts and the State Department of Agriculture. His headquarters are in the office of the State Entomologist, Mr. Franklin Sherman, Jr., but most of his work is in the field. North Carolina offers great opportunity in bee-keeping and the state already ranks high in the number of colonies of bees, but many of the North Carolina bee-keepers have not yet learned the advantages of modern manipulations and equipment. They have received Mr. Rea graciously and are coöperating most heartily, so that there is hope for great advances in this state. North Carolina now produces considerable honey but not enough to supply her own demand, so that it is now necessary to ship in considerable honey annually. The increase in production and the improvement in the quality of the product will beyond question increase the demand for honey, so that bee-keepers in other states need have no anxiety about competition from North Carolina for a long time. It is to be expected, in fact, that more honey will be shipped into the state than at present.

In Tennessee, Mr. C. E. Bartholomew, formerly of the Iowa Agricultural College, is working on a coöperative project between the Department of Agriculture, the University of Tennessee and the State Commissioner of Agriculture. His headquarters are in the office of Prof. C. A. Keffer, Extension Director, University of Tennessee, Knoxville, Tenn. Tennessee is also a great field for bee-keeping and probably has more progressive bee-keepers than most of the southern states except Texas. The brood diseases have made a start and much missionary work must be done to induce the bee-keepers to clean up. In many parts of the state the "gum" is common and perhaps the majority of the bee-keepers are not using the better methods. But the people of the southern states realize, perhaps better than those in other sections, what extension work may mean to their agriculture and we look forward expectantly to great results here. Mr. Bartholomew has been at work only a short time but the outlook is promising.

The third man on the extension force of the office is Mr. Kenneth Hawkins, formerly of Illinois. He is engaged on a coöperative project between the office of Bee-Culture Investigations of the Bureau of Entomology and the office of Extension Work in the South, States Relations Service, of the Department of Agriculture. Mr. Hawkins will travel throughout the fifteen southern states, assisting

the various extension workers in their efforts for the upbuilding of bee-keeping and will assist individual bee-keepers and organizations of bee-keepers wherever possible. The fifteen southern states have within their borders over half of all the colonies of bees in the United States. The last several years show an apparent falling off in numbers of bee-keepers and of colonies, but there can be no question that this portion of the United States has unexcelled opportunities for bee-keeping and when the modern methods have become common, the South will produce enormous quantities of honey.

Attention should be called to the fact that all extension work of the Bureau of Entomology is in coöperation with the established organization for agricultural extension. This coöperation is expected of all branches of the department but, I can assure you the coöperation was entered upon most willingly by the Bureau of Entomology. There is a vast and efficient organization in the United States, authorized by the Smith Lever act, for the advancement of agriculture through extension work, the extent and value of which are perhaps not sufficiently appreciated. In this organization bee-keeping plays a small part at present, but it is assuredly better for the field men in bee-keeping to take their proper places in this organization than to attempt to go unaided into the enormous problem of helping the bee-keeper.

You will perhaps ask why the extension work in bee-keeping is confined at present to the South. The opportunity in the southern states has already been made clear. By confining the work to this region there is all the work, and infinitely more than three men can do. A second reason is the receptiveness of the people of the South to extension work, in which regard they surpass some northern communities. A third reason is that the South is a virgin field in bee-keeping, offering an opportunity to test the value of extension work in bee-keeping without being misled by the results of other agencies. When it is considered that only a handful of southern bee-keepers read our journals and our books, this will be clear. Finally there is a reason worthy of consideration in the fact that we do not expect any opposition to the work from the southern bee-keepers. Frankly, it is realized that if this work were begun in some northern communities there might be opposition or open antagonism from some of the selfish bee-keepers mentioned earlier. With money enough for only three men there seemed no use in going at first into places where the work would encounter needless obstacles.

I sometimes wonder how many commercial bee-keepers realize the narrow escapes that some of our leading bee-keepers have had and how much they owe to some stimulating word from a widely informed bee-keeper. Bee-keeping is, as we all recognize, a business with many pitfalls and at the times the best of bee-keepers will be discouraged. This is chiefly because of the isolation of the bee-keeper. The name Alexander is now associated in our minds with a victory over European foul brood, yet a few years before his treatment was announced, Mr. Alexander went to a New York bee-keepers' convention to say good-bye to his friends. European foul brood had practically destroyed his business and he had definitely planned to quit. A few minutes' conversation with one of the state apiary inspectors changed all this, and we know the far-reaching result of that brief conversation. In this capacity the official inspector was an unofficial extension worker, and in passing it may be stated that by far the greatest good from inspection comes from the extension features of this work. Another New York bee-keeper of international reputation was saved to bee-keeping by the same man in much the same way. The brilliant Heddon gave up bee-keeping when he was most valuable to his fellow bee-keepers, a fact which we must always regret. We cannot know his inner thoughts at this time but it is an interesting speculation whether his attitude toward the industry might not have been changed by the stimulation of an extension man in bee-keeping. After Professor Cook left Michigan in 1893, Heddon's interest seems to have lagged, and we know that he put great confidence in Professor Cook. The difference between the voluntary help of a fellow bee-keeper and the assigned task of helping another bee-keeper is not a genuine one. Every man who goes into such work must carry with him a spirit of helpfulness, of just the kind which actuates every good bee-keeper when opportunity is offered to help his coworker. A large part of the assistance comes from stimulation to effort, perhaps more than from information imparted.

It would be easy to show that every bee-keeper at some time or other needs just such help as is planned in this extension work. There comes a time in the experience of every bee-keeper when he encounters a serious problem: European foul brood may strike him for the first time and find him unprepared; swarm control may seem an insurmountable problem; adequate marketing may appear virtually

impossible. At present he must get what he can by reading, by correspondence, and by expensive personal trips. When extension men are available, he can call on a man to help who knows from wide travel and experience, constant study and careful observation how these various problems have already been solved elsewhere. What would you give to have such a man as a helper?

It would perhaps be considered unnecessary to present these details to a convention of bee-keepers outside the territory covered by the work unless there was shown some way in which each bee-keeper were in some way involved. What this movement needs more than anything else is moral support. It can stand valid criticism, and this will be welcome, but in its infancy it will suffer if there is wild denunciation or ill-advised fault-finding. I hope that every bee-keeper will feel it his duty and take it as a pleasure to support this work. If you hear or read invalid criticism, show the critic where he is illogical and compel him to prove his assertions. If such things are published, ask for definite proof or retraction. There should be no attempt to stifle good criticism, however. The extension work does not demand financial support of bee-keepers, their time or their labors; it does demand their good will as does no other effort for the betterment of the industry. For this reason this subject is presented to you to-day.

Prof. J. G. Sanders, Economic Zoologist of the State of Pennsylvania was introduced to the convention and spoke on "State Aid in Future Development of Bee-Keeping."

He spoke of the plans that were laid for extension work throughout the State. The idea of doing the inspection work of the State is not in the way of coercion but rather that of stimulation. It is better to eliminate the word "inspector" and use the word "adviser" instead.

The former word carries with it the force of a policeman from which we revolt while the word "adviser" has a sound of helpfulness.

The plans for the future will be gauged largely by what the legislature will do in the way of appropriation.

The plan is to secure the help of an efficient man who will devote his entire time to extension work, and to further prosecute the work which has already been done successfully. He asked for the coöperation of the Association and urged that the membership be increased to ten times what it now is.

In a discussion which followed the address Dr. Phillips said that the time has almost come when we can dispense with the penalty clause of our inspection laws and do our best by emphasizing the educational part exclusively. No propaganda has ever been put forward that has advanced any line of work as the inspection and extension work among bee-keepers. We have now over 35 inspection laws throughout the States.

A paper was then read by the secretary on "Establishing a Trade Name in Honey," sent by E. R. Root, of Medina, O.

Establishing a Trade Name in Honey.

By E. R. Root.

Some years ago food products were sold in bulk. Such a thing as breakfast foods in package form was unknown. But the day has now arrived when there is a great variety of foods in all kinds of packages ranging anywhere from ten to twenty-five cents per package These foods are kept in a sanitary condition, carefully packed and sealed. Perhaps the reason why food in package form has become so popular is because the workingman cannot afford to buy food in bulk, but he can afford to get ten or twenty-five cents' worth. The manufacturers of package foods were quick to take advantage of this and hence various brands of food were put out.

Naturally enough, the different makers of foodstuffs began to establish a trade-

name for their products, for they recognized the fact that before their article would have a general sale it would have to be advertised extensively in magazines having a national circulation. The result has been that certain foods are advertised so extensively that they are in the mind of every housewife. Whenever she thinks of baked beans she thinks of Van Camps. If she wants some catsup, instantly there will come before her mind the name of Heinz and the "fifty-seven varieties." If she wants a breakfast food the name Kellogg or Pettijohn, "Cream of Wheat," and a dozen other standard foods, will occur to her. The food that she will be mostly likely to buy, however, is the one most thoroughly advertised; and the grocer or wholesaler will be compelled to put in stocks because the public will ask for the thing that has a trade-name and the one which is advertised most.

If it is a hot day, and one feels that he would like to have a soda water, perhaps the first thing that comes to his mind will be Coca-cola, because it is advertised everywhere on bill boards and in the standard magazines. I have asked the proprietors of several soda fountains what drinks they sold the most of, and the almost invariable reply has been "Coca-cola." When asked the reason why, the answer is, "Because it is so well advertised."

Bee-keepers have been very slow to appreciate the fact that their product, the finest food in the world, has never been, until recently, nationally advertised. Some years ago an effort was made to form an organization, national in character, the purpose of which was to create a demand for honey. It was proposed to assess all the manufacturers of bee supplies, the publishers of bee journals and the bee-keepers themselves, a sum equal to a certain percentage of their gross output or business. An organization was perfected and something like $1,500 was raised; but immediately the question was asked, "How is the money to be expended?" Some held that honey booklets should be circulated over the country. Others believed that honey ought to be nationally advertised, but when it was found that $1,500 would be only a drop in the bucket, and that practically nothing could be accomplished in that way, it was decided to put out some bulletins. This was done under the directions of N. E. France. Some good was done but the result so far as getting honey into the mind of the housewife was negative.

At various times since then, bee-keepers have proposed that an organization be formed to advertise honey. Resolutions were passed and officers elected, but that was about as far as things would go. Mr. W. A. Selser developed a trade in "Selser's Blossom Nectar." Mr. Walter S. Pouder sold considerable bottled honey in Indianapolis, but the trade did not extend much beyond his own state. In a like manner, Mr. C. H. W. Weber, of Cincinnati, and The Fred W. Muth Co., of the same city, put out bottled honey under their own brands; and while these were sold over the United States in some of the various cities, the sale was effected through traveling men exclusively.

In the meantime producers were not getting very much for their extracted honey. There were scores and scores of wholesale grocery houses that were not handling honey. Finally The A. I. Root Company, seeing that prices were going down, decided to start out on a campaign of its own. While we well knew that if we went to the business of advertising our own brand of honey it would advertise that of everybody else, we felt that it would develop the honey business and in the end make more call for bee supplies; for we had begun to see that some producers were going out of the business unless they could get better prices for their honey.

Under the then existing order of things, with the exception of the work done by the individual bottlers, the majority of bee-keepers were competing against each other in the same market. Most of them were not salesmen, and the result is that the finest food product in the world was being neglected.

We felt that honey ought to be sold in every grocery in the United States, and to that end picked out an advertising expert—the man who put Coca-cola on the map—Mr. D'Arcy, of St. Louis. We selected the name Airline, meaning the A. I. Root line, or the shortest line from the hive to the consumer and we are now advertising in journals of national circulation. We set apart a certain week as "honey week" in some of the large cities. During that week Airline honey was advertised in the local dailies. Airline honey in connection with live bee displays was placed in prominent grocery windows. Live bees drew trade. We kept on advertising in journals of national circulation in the meantime.

We do not care to tell how much we paid out to establish the trade-name "Airline." But I will say this much, that the price of extracted honey appeared to be going down early last summer in view of the enormous crop of clover honey that was in prospect. We felt that some heroic means would have to be adopted

to stimulate prices. We called in our man, Mr. D'Arcy. When he proposed a full-page advertisement in *The Ladies' Home Journal* and *Good Housekeeping,* I naturally asked him how much a page in the first mentioned journal would cost.

"Six thousand dollars."

"What! for a single insertion?"

"Yes, sir."

I remarked, "Not on your life. I would rather scatter that amount of money in smaller pages over more issues."

Then he went on to show that honey sales must be given a big boost at the beginning of the honey sales and then follow up with smaller boosts later on.

We were undecided. Finally some one reminded us that when the Germans brought their 42-centimeter guns to bear on the Belgian forts something had to come. Then it was pointed out that advertising out of season would not bring the result that advertising in season would secure. We finally told Mr. D'Arcy to go ahead and he did. You have seen our advertisements—full pages in the *Ladies' Home Journal* and *Good Housekeeping.* We were trying to get the eye of the housewife. You will remember that we advertised honey as a food and not as a medicine. We showed in that advertisement hot waffles dripping in honey and told of the fine quality of our honey candy, of how good honey was in cakes and cookies.

If you will read over the advertisement in the October issue of the *Ladies' Home Journal* you will see that we advertised honey in general and Airline honey in particular. What has been the result? In spite of the enormous crop of extracted honey produced last year, there is not much of it left in the hands of the bee-keepers to-day; and while I suppose I ought not to say it from the standpoint of a man who wants to buy honey, I will be frank with you and say I do not know where the bottlers are going to get their honey to fill orders. We are advised by the glassware people that they have had the best trade for glass bottles and tumblers for extracted honey that they have ever had in their history. Bee-keepers are even now asking me where they can get glassware.

Bottled honey is now sold everywhere, including the Airline and several other brands, in most of the best groceries in the country. The trade of all the bottlers has increased enormously, and yet only one of them did any advertising.

It would be folly for me to claim that the Airline advertising alone put honey on the map, thus making extracted honey so scarce to-day; but I do claim that it has been one of the important factors that have helped to boost the price of extracted honey so that to-day the public is consuming a larger amount of liquid honey than it has ever done before.

Of course there are other factors that have helped to boost the price of honey. The general upward trend of prices on everything as a result of the great war has had its effect. The shiploads of the cheaper grades of honey that have been going to European countries to supply the soldiers in the trenches have also had an effect. But there never was a time when extracted honey was so much in demand on the table as now.

There never was a time when there were so many magazine articles telling about honey as a food, as there have been within the last two years.

I will close by saying that it is time that bee-keepers get over their little petty jealousies and time that they will come to the conclusion that most of them are not salesmen. In trying to sell their honey to consumers many of them demoralize the market by selling it at retail and at the very same price they would sell it in a jobbing way to large buyers. There are a few bee-keepers who are also salesmen, but the majority would do well to bear in mind that they can do better by selling to a jobber who will give them the highest price for their product in good clean cash for the entire crop. E. R. ROOT.

The paper aroused considerable discussion on how to sell honey and the price one should ask. Bee-keepers are often at fault in causing low prices. Cases were cited where extracted was retailed for 10 cents a pound, while one man even offered to deliver it by parcel post for 55 cents a gallon. On the other hand some are selling dark grades at 30 cents a pound and light honey still higher.

SATURDAY MORNING SESSION.

The president, Dr. Surface, in the chair at 9:30.

The question box contained among others the following question: Is it safe to use combs once infected by European foul brood? Carr answered, Yes, I have 200 frames in use now that once were 75 per cent. diseased.

The secretary-treasurer reported as follows:

RECEIPTS.

Balance on hand,	$113 50	
Membership Dues,	89 00	
One Report sold,	60	
		$203 10

EXPENDITURES.

Secretary's expenses to Lancaster meeting,	$8 23	
Printing receipt cards,	3 25	
Expenses of Prof. G. S. Demuth,	10 00	
Printing 500 Envelopes and Letterheads,	3 75	
250 Envelopes,	45	
Phone Message,	25	
Printing Programs for Harrisburg meeting,	3 25	
Postage,	3 52	
Total Expenses,		$32 70
Balance on hand,		$170 40

The report was passed to the Auditing Committee.

A motion was then adopted that the secretary publish the yet unprinted proceedings of the conventions if the amount in the treasury is sufficient.

J. L. DuBree read a paper on "Box Hive Bee-keeping."

Box Hive Bee-Keeping.

Before starting, let me say that I am not a box hive bee-keeper myself, but as I am opposed to this line of work I thought I would talk on it to see if I could not discourage some who are.

First, I wish to say that any hive that will not allow of the frames being moved freely is classed by me as a box hive, whether it be an old log, or an up-to-date wooden hive that is built so full of brace and burr combs as to not allow the frames to be manipulated with ease. All of these kind of hives are a detriment to bee-keeping in any sense of the word. They not only let the bees do as they please, build any amount of drone comb which will not only cause a breeding of an extra quantity of drones which will, to say the least, use up a very large amount of honey to raise them, and also to feed them, during their life, but will prevent the queen from having the necessary room to lay worker eggs, whereby the colony becomes weaker than it should because the drones cannot gather honey, but do consume more than the workers, both in the larval stage and after attaining their growth; and as the box hives do not permit of manipulation, you are compelled to let them, the drone comb, remain from year to year, whereas if you have the up-to-date hives you can take out drone comb and use only worker comb, and the bees will not swarm as is always the case when conditions do not suit them, but it is impossible to either get a crop of honey from them or to treat them for diseases which I think would be a good thing in disguise if it were to infect every box hive in the state.

But let me say right here, I do think the box hive is the nearest perfect winter quarter a colony of bees can have, as I have bought bees in box hives that were falling to pieces so I had to wrap them up in burlap and brace them with slats to haul them home, and they kept 100 per cent. to the good right out in the open without any packing or wind-break whatever. The hives were the old ones with

glass in the back (that is they had glass in the back at one time), and an apartment at the top to put in an extra box for surplus. Now the boxes that can be used for surplus on the box hives are about eight inches square and about six inches high. This is considered a big quantity for a hive by the box hive bee-keeper, but taking the box hive and all other hives into consideration, the state averages 54 pounds or more to the colony. How much more would it average with all good up-to-date hives and also up-to-date bee-keepers. Now if you notice, the box hive bee-keeper as a rule does not want to change even after he has been shown the advantages to himself as well as to the bees, for as a rule he thinks he knows all about bees, and if you disturb them too much, the king bee will leave, and the colony will all die. I have a neighbor living within a mile and a half of me who has about 65 colonies in hives and boxes of all descriptions, and does not get an average of 65 pounds of honey off of all of them in a year. I offered to transfer a colony and run it one year for him, and if I did not get more honey off of one colony that he could off of ten, I would transfer all of them for him for nothing.

But he said there was no use of his going to the expense of buying comb foundation and frames and hives, as the bees did not like such "consarn contraptions," and would only swarm out and he would get no more swarms, as now he got two or three swarms from most of hives and as he does not sell any of his bees, you can see how much advantage that is to him. Now taking this as a sample, the neighborhood is keeping 65 colonies of bees, breeding all the time, which is about all that a vicinity of this section can stand. Now if he would use about five up-to-date hives, he would get more honey and the other bee-keepers in the neighborhood would also get more. Of course, you say there is not much honey in this section, but I will say that this season I took 725 pounds of extracted honey off of three colonies, or an average of 242 pounds per colony, and then did not attend to them as I ought to. I have seen bees kept in boxes made in two sections such as the long idea hive, and used without any frames or divisions of any sort, and when they were open it was a beautiful sight to see the old and new comb looking like lace and each layer a little lower down than the one in front of it, and as the bees built up, the bee-keeper would cut out a little honey here and there and throw away the brood that broke out with it while cutting away the honey, and of course the bees had to build up this comb and brood all over again, but on an average this man got from 25 to 30 pounds of strained honey per colony. Now if this man could take this amount of honey in this way, what could he have done if he had used the method that would have saved this brood and comb which I contend is worth more pound per pound than honey? I have seen bees kept in old lard tubs, and the owner said they were the best of hives, as the lard in the wood kept the water out and was better than paint to preserve the wood. This man left his bees in the tub till they swarmed and then sulphured the old hives, and took the honey, throwing away the comb containing larvæ and sealed brood and only saving the wax that contained the honey, and then using the tub for a hive for the next swarm that he got after it was ready to receive them. This August I transferred a colony of bees from an old sugar barrel to a ten-frame Hoffman hive. The bees were heavy with honey and had been hauled about three miles in a jagger wagon, and of course any of you bee-keepers know what the result was. There were about 40 pounds of honey, brood and comb in the bottom of the barrel, all mixed with dead bees and larvæ and bees so stuck up that they could not crawl about, and as the barrel was sitting on a board base about four feet square, the honey was running out of the barrel and over the edges of the base-board, and the poor bees were trying to gather it up and save it by putting it back in the barrel. Now as this barrel had been moved only two days before I transferred, the bees had not gotten their wax works started to working yet, and the most of them were filled with honey and hanging on the outside of the barrel waiting to form enough wax to hold the amount of honey that was going to waste while my own bees within a half a mile of these were taking the honey up to my place and storing it in the Hoffman hives where they had drawn comb ready to receive it. You may ask how I know they were my bees, but as I am the only one in that neighborhood who had the golden bees it was easy enough to tell them from the blacks which were in the barrel. Now my bees were not robbing as you might suppose, but were just helping themselves to the surplus that the others could not take care of, and they, the barrel of bees, were not making any resistance about it. Now I am trying to buy up the box hives anywhere near my own place so as to get them out of the way, but some of the people will not sell them for less than five or six dollars per box, and when I find one of this kind I try to buy all their swarms, but when they ask you from four to four-and-a-half for swarms, you

will see that a poor man cannot afford to clean up his neighborhood. Now all of them do not ask these prices, as I have bought them as low as a dollar and a dollar and a quarter per box and sixty cents per swarm, and then the people who sold them hived them for me in the hives furnished by myself. In conclusion, let me say that I think our laws on the box hives are not adequate, and we should have laws that would tax every bee-keeper in the state, say two cents per colony for up-to-date hives, and then raise the price according to the kind and condition of hives so as to prohibit the box hive bee-keeper from being the nuisance he is at present. I think this could easily be done, as the assessors always take the number of horses and cows the farmer keeps, and when they are making their assessments, they could easily ask the number of colonies of bees kept, which would be all that is necessary, and then the inspector get the list and see what condition the bees are in and rate them accordingly. Now this is but just a suggestion, and I will leave it with you bee-keepers to think over. But let me say, what I want to see is the number of people who keep bees not lessened, but added to the other side of the list, which is the side that makes bee-keeping pay.

"Transferring Bees From Box Hives and Trees" was then shown by W. D. Sellers.

Transferring Bees From Trees and Box Hives.

Transferring bees from box hives and trees is to my estimation the most neglected topic in bee publications and conventions, considering the many other discussed subjects of apiculture. In these days when the State and national government are making some effort to educate those of us that are not yet skilled to take care of themselves, and those of us that have all or part of their bees in box hives, should be taught and shown how to transfer their bees, which I think is the most economical way to get rid of the box hive. A box hive should go for these few reasons alone—that it is a great hindrance in keeping bee diseases down to the minimum that it cannot be inspected by the owner to see whether it has a good queen or not—that it has to be guessed as to whether it has sufficient stores or not. By the term box hive I do not mean a hive that has been made by the owner, himself or herself, that contains frames whether standard or not that can be lifted out one at a time to be examined, but by the term box hive I do mean a hive that has no frames at all and is simply a box with a few sticks fastened in crosswise to brace the comb. I will now first tell you how I transfer bees from box hives, as transferring bees from trees is a matter of recreation, and not a dollars and cents proposition, and is a little dangerous at that. The best season of the year to transfer is in the spring, when fruit bloom is in full swing, even then some colonies will not be ready to transfer, as they will be too weak in numbers. Upon your good judgment will your success a great deal depend in transferring, as a colony that is ready to be transferred is a colony that is overflowing with young bees. This you can tell by their play spells that resemble a swarm emerging from its hive, or if you can see their combs and find that they are making new comb, which shows up white at this season of the year. This is another good sign that they are ready to be transferred. If you have never transferred a colony of bees because you thought that you stood a good chance of being stung to death, or either had to wear a diving suit to be safe, I will say right here that you should get rid of these ideas, as they are unfounded. For protection I use only a veil over the face and no gloves on the hands, as I cannot work with pleasure with gloves on my hands. I must say that it is very seldom that I get stung on my hands except when I happen to squeeze one where I cannot see in picking up a piece of comb. The tools that are required are a hammer or hatchet, a good bee veil, a good bee smoker, and a banana knife, or any other sharp knife will do. I prefer a banana because I can cut comb out of places where I could not with any other knife, and in transferring you will get some mighty queer places to cut comb from. I use strips of muslin to tie the comb in the frame for a few days till the bees have them fastened, but strings will do. I prefer strips of muslin because it gives a broader surface to hold the comb. A string is sharp and will cut the comb on warm days, also with muslin the bees can tear it out should you not be able to do it yourself a few days after transferring. A bucket of water is needed as you can imagine that this is a somewhat sticky job. It may be best for me to state here that you should pick a day when the bees are flying fast to and from the field. You will then have the least amount of bees to contend with;

also the chances of starting robbing are not so great. I usually make a temporary bench out of a telescope hive cover, or anything flat will do as this is important so as you get your comb in the frame straight. I usually cover a piece of burlap over the bench as this makes a cushion to lay the comb with brood on down. Be sure that your smoker is in good working order and you are ready to proceed. Take the old box hive and stand it to a side with its entrance facing another direction and stand in its place your hive you wish to transfer it into. Now take your hammer and smoker and smoke the bees a little at the entrance, at the same time jarring them with the hammer. As soon as you hear them start to roar inside turn the box hive upside down and proceed to remove the bottom side and end. You will not have to be very careful about doing this as the rougher you handle them the better they will behave. The reason of this is the rough handling and jarring makes the bees think they are going to be expelled from their home so they set to work and fill themselves with honey, and in this condition they are as gentle as kittens. This is why you can handle the most vicious bees without being stung. This done, you will now see why I turn them upside down. In box hives the combs are most always fastened on the top and part way down the sides, and as the honey is always stored at the top of the comb, which makes it the heaviest part of the comb, you now have it just where you want it, and the part of the comb that the brood has been hatched out ever since the bees were put in the hive, or the toughest part of the comb, is just right for you to get a hold of to handle. In this way I have handled a larger piece of comb than it takes to fill a standard Hoffman frame. Now having your strips of muslin long enough so that they go around your frame with enough to tie, lay as many as you think it will take to hold the comb in its place down on top of the burlap and proceed to cut out the comb. If the first piece of comb is not large enough to fill your frame, cut out another till you see that you have enough to fill the frame. After joining the comb together as neat as possible, take your frame and lay it on top of the comb. Then with your knife cut the comb to fit the frame a little tight; then take the frame and squeeze it down over the comb and proceed to tie. After you have it tied, take hold of it with both hands and with a quick motion stand it up and adjust the comb in the center of the (comb) frame, then insert in the new hive. Proceed in this manner till you have all the comb transferred. By carefully smoking the bees away from where you are working, you will get them to cluster on the opposite side of the box in large balls which should be brushed off in front of the hive. They will then run into the new hive same as a swarm would when dumped in front of the hive. After you have all the comb transferred look for your queen wherever you see a small cluster of bees formed, as in this way you often find the queen, which you must save to make it a success. If you do not happen to be sure that you have the queen all right, look through them the next day and if she was lost in transferring you will find queen cells started. You can then send and get a queen or take one from one of your weak colonies and introduce to them, uniting the bees to them at the same time. If the above directions are followed carefully you should not lose more than one queen out of every ten. If the colony does not have enough comb to fill all the frames, fill it with frames with full sheets of foundation wired. It will be to your advantage to put a few frames with full sheets of foundation among the frames of brood. Now the great drawback among bee-keepers in regards to transferring their bees is the idea that the transferred colony will not store honey the first season, and that they will not do as well in standard hives as they do in the box hives, and for the benefit of you that may happen to have this same idea, I will say that I helped to transfer about fifteen box hives last spring at the Masonic Home at Elizabethtown, and the most of the colonies had only enough comb to fill about five Hoffman frames. The rest had to be drawn out. We used ten-frame hives, and these transferred colonies stored some 600 pounds of honey. This I am sure was many more pounds than they would have stored in the swarming boxes we took them out of, and to the best of my knowledge there was not one swarm. Some of you may wonder how this could be after being all torn apart with a lot of old comb to patch up and some new to make. But this is the reason: in transferring, all the drone comb was cut out which saved the colony, and the energy used of rearing all these countless loafers, at the same time the energy of keeping them after they were reared. By inserting wired frames with full sheets of foundation among the frames of brood, the queen occupied these frames as soon as they were ready, thus rearing an enormous amount of workers at the right time—fruit bloom. In closing I wish to impress upon you to keep your eyes open and be observing, as this will be a lesson of great benefit to you. You will find honey that has no doubt

been in this box hive ever since bees were put into it. This shows that they were never in a starving condition; that from the rousing condition they must have a good queen, and that the general makeup of the hive it must have been ideal for wintering it, being anywhere from one to two feet high. For success with bees, you must have plenty of good stores, a good queen, and a deep hive to winter in outside. I am sorry that I included transferring bees from trees because an afterthought made me think that I might send some one to a sorry end, but as it is now too late to retreat I will tell you as briefly as possible how I hunt bee trees and get them down. I have read a good many ways of hunting bee trees, such as burning honey, burning beeswax, and exposing honey so as the bees would come and feed on it and then watch them which direction they would take and follow them. In hunting bee trees you want to get as close to the tree as possible at the start, and as you most all know that bees need a large amount of water, go where you know where water is, and it will not take long for you to see in which direction your bee trees are. In this way you can find out whether there is more than one in the neighborhood by the different routes that are used. After making sure that you saw a number of bees using the same route, hurry to the point you saw them last, and then by watching them as far as you can see them, from this point go to the next and so on till you find the tree, which will not be far off, as bees most always go to the nearest watering place and use the shortest route to it. After the tree is found and the bees happen to be in the limb, there is no need to cut the tree down but just the limb. If you should be alone, have a rope along, so that you can tie all your tools, so that you can pull them up to yourself instead of being bothered with them in your climb. Also it may be necessary for you to descend quickly after the limb is cut should the bees make you trouble. If the limb does not appear rotten at the bottom take your saw and partly saw this through, because by sawing them at the top first and limb breaks off before it is ready the result is it has strength enough to hold the limb from falling away from you, and should the bees have a bad temper you will find yourself in a tight place. People have been caught in a place like this, and in their hurry to get away from the bees, fell off the tree. After you get your bees to the ground quickly saw your limb again so as to head the bees off as they will run up the limb as far as the cavity goes. Then split open the limb and proceed to transfer the bees same as from the box hive. It should be understood that it is a heavy fine to destroy trees in this way.

E. G. Carr spoke on "Securing a Maximum Crop of Honey."

Securing a Maximum Crop of Extracted Honey.

Every honey producer desires a maximum crop, and this is right. Anything less is, in a degree, failure. In extracted honey production a maximum crop is dependent upon a number of factors all of which must be present if the greatest success is to be attained. Some, in fact the majority of these factors, are under the control of the bee-keeper. Some of the essential factors such as the secretion of nectar in the plants and the weather conditions during the honey-flow are not within the control of man. However it is those factors which are directly under the control of man which we wish to discuss.

Equipment.

It has been said that bees will store as much honey in a soap-box as in the most expensive hive made. If the box is large enough this may be true but such a thing has never occurred and it is not probable that it ever will. There is no intent to give the idea that a hive must be costly to be satisfactory. It may be but is not necessarily so. The cost is not the most important consideration. Its fitness for the work to be done is the main thing to be considered.

The hive should be such as will give good protection to the bees during unfavorable weather conditions, and be easily and quickly adjusted to properly accommodate the largest colony and a maximum crop of honey.

It is believed a hive taking ten self spacing L size frames will be found satisfactory for both the brood body and extracting super.

It is assumed that all combs are as nearly perfect worker size cells as possible. There should not be more than six inches square (36 square inches) of drone size cells either in extracting supers or brood chambers except in brood chambers of

colonies from which choice drones are to be reared. Should the combs not be in this condition, steps must be taken to bring them up to this standard. They may either be patched, drone comb cut out and worker substituted or the entire comb discarded and a full sheet of foundation substituted.

Unless this is done a maximum crop must not be expected.

Young Queens.

Another factor under the control of the apiarist is young queens. Someone has said, "old hens for breeders and pullets for eggs." Since therefore eggs which will later become producers, are what is needed in every colony except those which show exceptionally desirable traits should be re-queened at the close of the white honey-flow. This will give the bee-keeper an opportunity to notice and replace any young queens which do not show a good performance in egg production. For this reason every successful apiary will maintain a few nuclei with young queens reared from the best stock always on hand to replace at once any queen whose performance is not entirely satisfactory.

Winter Stores.

Abundant good stores for winter is another controlled factor. Many if not most bee-keepers are mean with their bees—they leave them just about the amount they will probably get through the season of no gathering with provided it is not of unusual duration. Then when unusual circumstances arise the bees either breed slowly resulting in a colony too small to get a maximum crop or they use up all their stores and starve. Five pounds of stores more than it is thought will ever be needed is the best paying investment a bee-keeper can make.

Winter Protection.

Ample winter protection is another controlled factor upon which a maximum crop depends. When we realize that bringing a colony through the winter alive is not necessarily good wintering we will be on the road to the maximum crop. Many bees come through winter alive but with vitality so impaired through labor in keeping up the temperature that they are not able to do a good day's work and soon die whereas if it had not been necessary for them to expend their energy in this manner they would have still an abundant supply to do the maximum amount of work.

Ideas of the amount and manner of applying winter protection are almost as numerous as bee-keepers. It is certain however that efficient packing is not necessarily expensive.

Users of the quadruple case report good results. Only as a last result would I adopt it because it is unwieldy and untidy.

The Buckeye Protection and other type of double walled hives when provision is made to prevent the escape of heat at the bottom give good results.

The Dadants are satisfied with forest leaves in the telescoping cover and leaves held around three sides of the hive (none in front) by a strip of poultry wire netting, and their crops show they are successful. The handiest and at the same time effective winter packing is one used by C. H. Root of New Jersey. The hive is placed on a four inch deep tray filled with leaves. The hive cover is removed leaving the inner cover in place and over the hive is telescoped a double walled case without top or bottom. Provision is made for two inches of packing (ground cork) in this case which is permanently held in place. Over all is telescoped a cover which holds four inches of forest leaves held in place by burlap. Packing and unpacking is the work of but a few seconds; the case will last for years and is not expensive.

Spring Examination.

On the first suitable day in spring when the weather has become settled all colonies should be quickly examined to determine if any have lost their queens or are in need of stores. Queenless colonies should be doubled up with queen right ones and if all were supplied with thirty pounds of stores the previous autumn any shortage may be made up by exchanging combs with colonies having more than enough. For, strange enough, some colonies apparently alike and under like conditions will consume more stores than will others.

Encouraging Brood Rearing.

From the time of the spring examination until the beginning of the honey-flow, every effort should be made to get the maximum number of bees in the colony and to keep the colony contentedly together.

Stimulative feeding is of doubtful value and is not likely to be needed when colonies are properly supplied in the autumn.

After heavy breeding has started all colonies should be examined weekly to note and supply any extra room which may be needed. This examination should be as short as possible and often will only involve raising the hive cover or at most lifting one frame.

Colonies may be built up individually in which case any extra prolific queens may be detected or brood may be taken from the stronger to help the weaker.

Giving Extra Room.

When a colony has an equivalent of six or more frames of brood another body of drawn combs may be added and if the colony is strong two frames of brood may be placed in the added body, their place being filled by empty combs. This will usually satisfy the average colony until the honey-flow starts.

In extracted honey production the aim should be to always keep slightly in advance of the bees in supplying room both for brood-rearing and honey storage.

Should the two stories become well filled before the honey flow commences a third body should be added.

When the honey flow has been on for about a week the colony should be overhauled, the pollen combs and those with the youngest brood placed in the first story, a queen excluder next put in place, over this the second story with eight frames of the old brood and honey, evenly spaced and the third story when needed with eight combs or if foundation is used, ten frames may be used until they are partly drawn out when two may be removed and the remaining eight evenly spaced.

Usually no further attention need be given the brood nest during the white honey-flow provided any colonies which show signs of inadequate ventilation be blocked up from the bottom board.

Any further need of storage room is easily and quickly ascertained by lifting the cover or by drawing a single frame and any further supers added at the top.

Evidence that top supering is not equal to bottom supering in extracted honey producing is not to be had and it is certainly quicker and easier.

Enough supers should be provided to hold the honey from one flow.

The control of swarming is assumed since the maximum crop is impossible when the bees are allowed to swarm. It will be noticed that four of the factors which influence swarming are given attention viz., young queens, ventilation, room both for the deposition of eggs and the storage of honey, and drones reduced to the lowest possible number.

If every bee-keeper will heed the suggestions mentioned he will have done his part toward securing the maximum crop.

After this address the president said the convention was not satisfied with what they heard of Dr. Phillips, but wanted to hear further from him. He responded by an address on "Results of Apiary Inspection."

The Results of Apiary Inspection.

By E. F. Phillips.

The inspection of apiaries in the various states is unfortunately conducted according to many different systems and in some cases with little apparent system. This work cannot be cast in a mold, because of the wide divergence of conditions in the various bee-keeping regions of the United States, but it would seem possible to standardize the work to some extent by discussion in this Association and elsewhere. To show the divergence more clearly, some of the differences in plans may be mentioned. In some states it is the policy to do intensive work by attempting to visit and advise all the bee-keepers in a locality before the inspector leaves; in other cases inspection is made only on request and only a few bee-

keepers are visited on each trip from the central office. In some cases emphasis is placed on work with the individual bee-keeper; in other states meetings and demonstrations are held to reach a larger number of bee-keepers. In some states the supervising officer has a bird's-eye view of the situation throughout the state, made possible by adequate records and maps; in other instances the inspector has no such efficient records and wanders more or less aimlessly about, helping wherever he can but without a broad outlook. To obviate some of the grosser errors, the Bureau of Entomology has advised supervision of the work by an already existing office, not only to save administration expense, but especially to make the work constructive, comprehensive and efficient. The history of inspection proves conclusively the advantage of such a system and shows the relative inefficiency of an independent inspector.

The title of the present paper indicates a desire to know whether the apiary inspection is profitable. At the request of bee-keepers, the various states are spending thousands of dollars annually in this work. It has been in operation on an ever increasing scale since the first law was passed in Wisconsin in 1897 and enough experience is available to warrant the demand for a showing of results.

If conclusions are based on observations of a general character, one must believe that inspection is a decided benefit. Even in those states where there is little or no system and where the most careless work is done, we find individual bee-keepers aided to better bee-keeping and enabled to combat disease with success. The making of one good bee-keeper in a county may result ultimately in greatly increased wealth to the state, so that one cannot easily measure the economic value of such work. In spite of valid criticism, and there is abundant room for criticism in various states, we must conclude from such an examination that apiary inspection is economically sound and that the expenditure is warranted.

But so far the general approbation of the work has been based on just such general observations, without analyzing the situation carefully. It is now well after twenty years of trial to examine at least some of the available data to make the criticism more valuable. Such an examination cannot be made comparative because of the divergent systems just mentioned and often because of lack of available records. It is entirely just to conclude that where intelligible records are lacking the work is least valuable. To analyse all the available data is an enormous task, which cannot be undertaken to present, but a few specimens may stimulate the administrative offices in this work to apply this test, and it is hoped that the analyses will be published. These results should be announced even though the results are not all that might be desired, and if possible the results should be interpreted. This is the type of comparison and tabulation which the author recommended to this section at the annual meeting in 1915.

In the Mohawk Valley, New York, European foulbrood broke out in 1894 but it was not until 1899 that apiary inspection was established, as a result of the efforts of the organized bee-keepers. The inspectors made an effort to determine the loss in colonies actually destroyed by disease, and, while this record is probably incomplete, they found that colonies valued at $39,487 were reported as lost. In 1899 (the first year of inspection) and successive years to 1904, the loss of colonies that died was given in the 1904 report as follows:

1895-1899,	$39,487
1899,	25,420
1900,	20,289
1901,	10,853
1902,	5,860
1903,	4,741
1904,	2,220

When we consider the fact that in 1900 diseased colonies numbering 7,253 were found (valued at perhaps $40,000), it is evident that the disease was spreading with great rapidity and the State of New York made a good investment in establishing inspection whereby the percentage of diseased colonies was forced down from 23.9 in 1900 to 3.6 in 1905. About that time other outbreaks occurred but the per cent. of colonies diseased has remained low.

Perhaps a better but less definite indication of the way in which, through inspection and education, the epidemic has been turned to the advantage of the bee-keepers is in a comparison of past and present conditions in the Mohawk Valley. It appears that before the outbreak of European foulbrood there were comparatively few extensive bee-keepers in the valley and many uninformed and

indifferent small holders. No inspection or educational system yet devised can save the careless bee-keeper and it is unsafe to attempt too much along that line, but through the efforts of the inspectors and other educational sources, the careful bee-keepers and those who would make an effort to clean up the disease were instructed in the diagnosis and treatment, so that to-day they have little fear of European foulbrood. There are probably fewer bee-keepers than formerly but undoubtedly there are more colonies of bees and the average annual crop is larger than before the epidemic. The epidemic has thus been turned to an actual benefit to the industry through inspection.

Through northwestern Indiana, European foul brood is prevalent and has probably been present for many years. In the eastern portion of the state, American foul brood is abundant and has caused enormous losses. On a brief trip of inspection, which the author took with Mr. George S. Demuth, then chief apiary inspector but now in the Bureau of Entomology, several apiaries in the European foulbrood territory were found in which every colony was diseased.

In 1909 apiary inspection was instituted in Indiana under the supervision of the State Entomologist. Of the 6,036 colonies examined that year 23.7 per cent. were diseased and in Porter County 66.5 per cent. of all colonies inspected had European foulbrood. The highest record for the prevalence of American foulbrood so far recorded is for Randolph County, Indiana, in 1910, where 83.5 per cent. of the 3,000 colonies examined were diseased or dead.

To determine the results obtained through inspection, Mr. Demuth has kindly drawn up the accompanying table from part of the Indiana inspection records for the years 1909, 1910 and 1911, when he was doing the inspecting. Counties were selected where inspection had been carried on in two successive seasons, and separate counts were made of those apiaries which were reinspected the second season. The revisited apiaries were usually those owned by bee-keepers who in the judgment of the inspector were probably most in need of assistance and stimulation.

It may not be entirely clear why an entire county should show a decrease in the percentage of diseased colonies when only a part of the bee-keepers had been visited, as was the case. This is doubtless due to the fact that the instructions of the inspector have been passed on to other bee-keepers, indicating that the benefits of inspection are wider than might at first appear. It is also gratifying to see that in the reinspected apiaries there is usually a gain in the number of colonies amounting to about 5 per cent. in all. A decrease from 45 per cent. to 19.6 per cent in one year is certainly a high commendation of the efficiency of the work.

In this state, not only is the percentage of diseased colonies being reduced but the bee-keepers are finding out what their trouble actually is and bee-keeping conditions are rapidly improving. It will take strenuous and continued inspection and encouragement to put the business on the footing which it should occupy but the short time so far spent in the work shows that here too the epidemics may ultimately be instrumental in making better bee-keepers and thereby be an indirect benefit. In Randolph County, where 83.5 per cent of the colonies in 1910 showed American foulbrood, conditions have materially changed. The data are not at hand but Mr. D. W. Erbaugh is responsible for the statement that at present American foulbrood is scarce and the bee-keepers in that territory are increasing their apiaries and are finding bee-keeping profitable. This is the most striking result of the Indiana inspection, even though no work was done there between 1910 and 1916.

Through the courtesy of Mr. E. G. Carr of the New Jersey inspection service, I am able to give data concerning the percentage of infection in Salem, Cumberland and Cape May Counties, New Jersey, in 1913 and 1915.

County	A. fb. 1913	A. fb. 1915	E. fb. 1913	E. fb. 1915
Salem	3.3	0	5.9	2.5
Cumberland	0	0	16.9	10.1
Cape May	0	0	34.7	8.4
Total	1.4	0	16.7	6.2

It is interesting to note also that in this territory in 1913 there was European foulbrood in 30.2 per cent. of all apiaries inspected and American foulbrood in 3.8 per cent. In 1915 no American foulbrood is recorded and European foulbrood was found in 25.9 per cent of the apiaries. Of course the per cent. of apiaries showing disease cannot be decreased as rapidly as the per cent. of infected colonies. During the two years the number of colonies increased from 836 to 1,136, a gain

TOTAL INSPECTION.

INDIANA. County.	Colonies Examined.		Colonies Found Diseased.		Per Cent. of Disease.	
	1909	1910	1909	1910	1909	1910
Cass,	87	13	38	1	43.9	7.7
Daviess,	117	171	8	7	6.8	4.+
Hancock,	33	54	25	12	75.7	22.2
Jefferson,	256	250	71	13	27.7	5.2
Lake,	270	130	163	32	60.3	19.6
Marion,	180	197	42	3	22.2	1.5
Newton,	209	83	68	18	32.5	21.8
Pike,	66	69	20	8	30.3	11.5
Porter,	508	687	348	265	66.5	38.5
Jasper,	625	*306	278	*27	44.3	*8.8
Total,	2,360	1,960	1,061	386	45.	19.6+

DIVIDING COUNTIES ACCORDING TO PREVAILING DISEASE.

E. fb.,	1,882	1,459	923	358	49.+	24.5
A. fb.,	478	501	138	28	28.8	5.5

*No inspection was made in 1910 in Jasper County and the results of the wor k in 1911 are here given instead. Since the results are comparable the figures for this county are included in the totals.

APIARIES REINSPECTED SUCCESSIVE YEARS.

Colonies Examined.		Colonies Found Diseased.		Per Cent. of Disease.		Prevailing Disease.
1909	1910	1909	1910	1909	1910	
15	15	3	.....	33	.....	E. fb.
59	72	5	4	8.4	5.5	E. fb.
.....	.....	.....	.....	.....	.....	A. fb.
165	168	57	12	34.5	7.1	A. fb.
104	66	87	8	83.6	12.1	E. fb.
70	73	27	3	38.5	4.1	A. fb.
32	13	30	12	93.7	92.3	E. fb.
63	33	20	5	31.7	15.4	E. fb.
428	470	305	184	71	39.1	E. fb.
173	*246	99	*37	51.4	*10.9	E. fb.
1,109	1,156	633	265	57.+	22.9	
874	915	549	250	61.6	27.3	
235	241	84	15	35.7	6.2	

of 35 per cent., which is the true test of efficiency. The plan in New Jersey is to cover a county as completely as possible before leaving it.

In Connecticut in 1910 there were inspected 1,595 colonies, of which 49.6 per cent. were diseased and disease was found in 76 per cent. of the apiaries. Without giving the data for the intervening years, it may simply be recorded that the records for 1916 show 3,898 colonies inspected, of which 7.05 per cent showed European foulbrood and 0.15 per cent. showed American foulbrood. European foulbrood was found in 18.8 per cent. of the apiaries and American foulbrood in 1.07 per cent.

Obviously charges in inspection policy and the routine methods of the work will influence these figures. For example, in Connecticut inspection was formerly done only on complaint and this restriction has been removed. However, from the figures given for these four states there can be no doubt of the economic value of the apiary inspection.

It will be noticed that in the four states chosen the apiary inspection is under the supervision of a central office, in three cases that of the Entomologist. In making a study of the available data to obtain material for this paper, the records were studied of a number of states where this supervision is lacking. In no such case did such a benefit appear as in the cases chosen. Usually the data are more faulty. There is not observed such a consistent gain, and in some cases no gain whatever is observed. Therefore, it must be admitted that the instances chosen are not truly representative. It is not known whether the best records have been chosen but they are certainly among the best. The data must therefore be interpreted as showing what can be done under good management. Every effort should be made to improve the inspection service in some of the states and this can perhaps be done by publication of the results of inspection, as was recommended at the last meeting of this section. The inspection must also be improved by discontinuing so far as possible the payment of inspectors only for days spent in the work, which too often means for days when they are not otherwise occupied.

The title chosen for this paper may be assumed to be covered by the type of data given, but this opportunity it may be well to enlarge the discussion by way of pointing out a method of overcoming some present defects. As is well known, the Bureau of Entomology has during the year begun extension work in bee-keeping, in coöperation with the regular extension office. So far this work is confined to the southern states. When it is considered that the value of inspection comes chiefly from the efficiency of the educational feature of the work, it will be seen that, in a sense, extension work is but a continuation of what has been done for years in some states. However, an extension worker is freed from the odium of police power, which is at times a detriment to the inspection work. Since in perhaps half the states the apiary inspection is below its possible efficiency, and, since without unwarranted interference this cannot well be changed, except by the bee-keepers of the state who often fail to recognize the poor quality of the work, it is pertinent to suggest that extension work should replace at least the incompetent inspection, or, if it is possible, supplement and stimulate it.

The future of the bee-keeping industry depends in no small measure on the creation of professional bee-keepers. Apiary inspection was instituted chiefly to save what already existed and was not conceived as a creative agency. If inspection is to assist in giving the much-needed impetus to the industry every apiary inspector should emphasize the extension features of his work, so far as his authority will permit, and in addition should encourage and support the extension work which openly assumes the task so long carried unannounced by the inspection. By enlarging the extension work to the fullest extent we may expect still more satisfying results than those here tabulated.

SATURDAY AFTERNOON SESSION.

President Surface presided. He called for offers for the next meeting. A motion was carried that the winter meeting be held in Lancaster, and a summer meeting be held in June in Philadelphia.

A question was asked: How low can the temperature be to open a hive without chilling the brood? Dr. Phillips answered by saying that a hive should not be opened if the temperature is lower than 60 degrees in the shade.

Miss E. S. Brinton was then called and read a paper on "Possibilities and Limitations in Bee-keeping."

Possibilities and Limitations in Bee-Keeping.

In addressing this meeting of bee-keepers, it is possible that most of my audience are experts, persons of long years of experience, trained in efficient bee-keeping, here to listen to subjects of a highly specialized nature. Very humbly, I must say there is little that I can contribute. I am a small bee-keeper—a plodder without a sensational record of success. I came here to learn and have little to give. But to the beginner, amateur and those of little experience, perhaps I can be of some assistance. I am so slightly removed from the same class that my trials and problems are still very vivid, and I have all sympathy for those following in my footsteps.

One of the things about bee-keeping that has impressed me very seriously, is the number of people who have undertaken it and failed. By failures, I include those who have gone entirely out of business, and also those whose bees are non-productive and unprofitable because of ignorance, indifference, or discouragement, on the part of the owner. In the few years that I have been interested in bees I can recall in my home neighborhood some sixteen persons (men and women of varying ages) who have started bee-keeping. At the present time only two, possibly three, can seriously be called bee-keepers whose apiaries are thoughtfully managed along modern ideas. Nine have gone entirely out of business. The others have a few hives improperly cared for, often neglected. Some were wise enough to sell while the equipment was in good condition, with others it simply rots on the ground.

Think of the money loss to these people and of the waste of good materials, benefiting no one!

Now the object of these association meetings is to arouse interest in bees and bee-keeping, honey production and consumption; and it succeeds for we all go home with more enthusiasm and we advertise and talk our hobby to every one. And our friend or neighbor impressed by our booming success wants to follow suit. That is all right and if he succeeds, we rejoice. But fourteen times out of fifteen he fails, and we have no serious regrets—merely have a passing thought: "Well, the manufacturer is in the price of his hives, and he has no honey to sell, so my business is not hurt—I guess there is little harm done." *That* is *wrong.* If he had succeeded he would have needed more and more equipment and each year sent in a larger order to that manufacturer of bee goods—also he would want bees, queens, wax for foundation and possibly even honey from other bee-keepers. Consumption of honey among *all* his *friends* is increased simply by his enthusiasm. Bee-keeping happily, is not yet so finely organized that the little man *must* be sacrificed for the good of the community.

Bee-keeping, while classed as an agricultural subject, differs from all other branches of animal industry. We are dealing with insects not animals. Bees have been known to use for thousands of years yet in all that time they have never been in the slightest degree tamed, trained, or domesticated. That means that any form of management we wish to pursue must conform exactly to their usual habits of life. It has been said by one authority that the ideal handbook on bee management has never been written but when it does appear it will be the life and habits of the honey bee, so clearly and simply stated that further directions and rules for handling would be superfluous and unnecessary. Here then is a complex industry, a problem to scientists and a puzzle to experienced operators; yet a man (or a woman) will plunge in, without previous preparation, with no thought of securing text books and journals and every other source of possible information, and is mightily disappointed, if he does not secure at least one swarm and a rousing surplus of honey the first season.

It has interested me to analyze some of the failures previously mentioned. Two of them, I am convinced were caused chiefly by too large a capital to begin with. Both were intelligent, educated young people. One a young man, started by advertising for twenty-five colonies of Italian bees. He found himself overwhelmed with trouble and did not survive the second summer. The other, a girl, acquired at once nearly everything in the catalog; hives by the dozen, extractor, jars, printed labels and cartoons, etc. If she had stuck at it, I am sure she would have won out, for she worked and studied faithfully, but a series of expensive mistakes discouraged her and she sold very wisely while her equipment was in good shape and had a market value.

Our State College experts have worked out exactly the cost of the barns we can profitably construct for our cows. They say that a stable costing over $150 per cow is so expensive that the cows can never pay the interest on the money

invested. That is a warning to all millionaire farmers that if they desire elaborate ornamental buildings—up to a certain amount can be charged to the stock, the remainder must be considered merely an extravagant whim of the owner. The same with bees, though I have never seen it computed so exactly. If we have just a few colonies, it is not necessary to have all the special apparatus that is advertised. If a little thought is used, in many cases a makeshift will serve the same purpose—at least until the bees themselves can pay for better labor-saving devices. Your pocket book may be able to afford such luxuries easily enough, but the bees cannot until they have really earned it.

My solar wax extractor cost 80 cents, and apparently does just as good work as one listed at $4.50. It is simply a twenty-five pound box. A tin smith made a shallow, oblong pan pointed at the end with a piece of brass strainer wire inserted. This rests on a block of wood and slopes down to an enamel pan discarded from the kitchen. An old pane of window glass lays on top. The finest of yellow wax comes from it. I buy a pair of ten cent gloves, sew on muslin uppers and I have a pair of sixty cent bee gloves. A wisp of dried grass does better work than a made bee brush. If there is a lot of old combs to melt up, I have found that the lard and sausage press, used on the farm for years makes a very satisfactory wax press.

Now to return again to the bee-keepers who fail: I believe that the chief cause of failure is a misunderstanding as to what are the real requirements of successful bee-keeping. A snow white hive under an apple tree is an ornamental addition to any backyard—and the bees look very peaceful drifting in and out. The novice sees the honey removed and enjoys its delicious flavor all winter. He does not realize that bees require food, drink, protection from storms and cold, and constant attention during their active season just like other live stock. Of course, if he is otherwise interested and forgets them they will not cluster around his door yards like chickens, or pester him with squeals or barks of impatience, and the S. P. C. A. will not arrest him for cruelty to dumb animals—but his colony will slowly dwindle until some day he finds something has happened. "How are your bees, neighbor, and how much honey did you get?" "Not a bit, I had bad luck, and the bee moth ate them up." Sure enough, there was the evidence in the hive—nothing left but worms and webs and moths!

Eight of the failures were like this: bee-keeping as a side line when there is nothing else to do more entertaining. Provide them with books and papers, but as soon as they want information they use the telephone. If one sells a colony to a near neighbor, it amounts almost to an out apiary, for he is called on to watch the first flight in the spring—to help hive eight swarms and finally tuck them all away for winter.

Now bee-keeping is not such hard work, neither is it continuous, but the right thing must be done at the right time. This requires self sacrificing sometimes. It means working with the bees on the nicest days when the temperature and skies are just right for a lark. Housecleaning should be looked after the first warm day in the spring. You possibly had other plans made, but such days are few and far between this time of year, and perhaps some colony is suffering for food, or is queenless. Prompt attention may mean profit instead of loss for that season. Swarming time means constant guard duty with only the rainy days for vacation. One successful bee-keeper told me last summer that for six weeks he scarcely left the place—but at the end of the season be measured his honey in tons.

After the honey-flow there is another danger; constant watchfulness must be used that no preserves or dabs of honey be left carelessly lying around the apiary, house, or lawn. Stolen sweets are sure to stir up trouble. I remember one very hot sultry Sunday, just at dinner time I heard the greatest roar of bees around our back door. The cause was a tier of empty supers stacked in an out shed. There were a few cells of honey in some supers, but I had covered them carefully and thought them safe. But one tiny crevice was overlooked. There was nothing to do but get into a nice, warm, bee-proof dress and spend the rest of the day alternately quieting the bees in the apiary, and soothing the family, self-imprisoned in the house.

Truly bee-keeping calls for patience and good humor, but also it is well to have a quiet manner and an infinite capacity for taking pains. You may not be naturally endowed with these qualities, and you may never permanently acquire them, but in time, if you are wise, you will learn to assume them when working with bees.

And that capacity from taking pains must be practiced in the way you care for your equipment, especially the hives. Did you ever count the pieces in one?

There are just about 100 separate parts to each hive and to each comb super, and each piece is put there to serve some distinct purpose. A bee hive is not an over-night invention. Many wise men have been instrumental in developing it from the old straw skep to the present form. The habits of the bees cannot be changed, and if we want a light weight, accessible hive with every part movable, reversible, and interchangeable, in which the bees will cheerfully produce quantities of perfectly finished honey, we must *still* hold to their ideas of hive dimensions. So the spaces are calculated to the thousandth of an inch, and the various strips, cleats, and frames are measured and placed exactly according to their definite rule. Then some amateur leaves out his super springs, or a fence or two, or does not space his hive frames properly, and scolds because the bees made such a mess of things with extra comb and propolis! One of these amateurs carefully explained to me recently how his honey crop was spoiled last year, because all his bees became intoxicated from a bed of poppies his wife had growing on the lawn. They had ignored the starters and built the comb hit or miss every direction among fences and sections! By close questioning I found he had no proper tools for fastening the foundation, and had used some method of his own which had evidently been ineffective, and the bees had nothing to guide them. (I will modify slightly a former statement—a makeshift method will not do for fastening wax foundation in frames and sections. The best utensils and the utmost care is needed, or all is lost.)

Stings? Yes, I had experience there, too, and almost lost my nerve. I made the same mistake as most beginners—trying to be brave instead of safe and sensible. I have not a bit of patience with those bee demonstration meetings where experienced veterans perform all kinds of stunts to thrill the onlookers. Such stories always get into the newspapers and creat in the layman mind, a false sense of security that inevitably brings disaster to the amateur who practises it.

In my first years of bee-keeping, I was particularly fortunate in finding a ready market for honey close at hand. A lot of country week children were boarded on an adjoining farm. I treated them to honey a few times with no thought of return, but after that they preferred honey to candy, and most of their pennies came my direction. They were not particular as to appearance, so that it was sweet and good. One summer, because of some peculiar condition the honey was very dark, but the children bought it just the same. That autumn when talking to an experienced bee-man, I was shocked to find I had been innocently selling honey-dew! He had barrels of it—a dead loss on his hands. Well, it did not hurt the children, and it saved me from what otherwise would have been a very discouraging season.

Since then I have enlarged my selling field considerably; retail, wholesale and private customers in distant cities.

Marketing is perhaps more or less a local problem that each bee-keeper must work out for himself. The locality will partly decide whether extracted, comb or chunk honey is produced. If everything is shipped wholesale to a distant market, quality of goods, as shown especially in appearance and packing, must be emphasized, and for best prices that market must be selected that shows a preference for that particular kind of honey he has to sell—such as very light, amber, or dark buckwheat.

From my experience, however, I believe that the home market is a field that will yield remarkable results, if properly cultivated. In the first place the actual eating quality of the honey will count more than appearance alone. Comb honey can be graded into just one class. Sections slightly stained with propolis, or cappings a little yellow—will not interfere at all with the sale. Extracted honey need not be absolutely uniform in color providing the taste is right. For a local trade one need not be so careful to remove every section as soon as it is finished. Seasoning honey on the hive will probably result in travel stain, but the improvement in richness and flavor is much more important. Your customers will excuse an off appearance on account of your reputation and accessibility, for they know they can return it if unsatisfactory; but short weight is an unpardonable sin and your best friend and neighbor will never forgive it.

One good customer told me she bought my honey because it was more tender and less waxy than anothers. It may have been a case of leaving it on the hive longer, but I suspect that possibly full sheets were used in the sections. I had not felt I could afford them. Now this year I plan to use them and am fearful of the consequences.

I live in a thickly settled rural community, too far from a main highway to use the roadside selling plan. A town of 12,000 is within easy reach, but it

seemed as though all the stores and retail trade were already supplied. So I resorted to few postal cards to my own friends to sell my crop. Some wanted only extracted honey. An extractor was purchased and often the customers own jars were filled. Then some stores were found, who refused to handle comb honey, because it was easily broken and generally messy, and the jars often candied and then would not sell. Pasteboard cartoons settled the section problem and I guaranteed to replace all honey that candied—and a new field was opened. I had not a large amount to call on and before the season was over it was exhausted, and other producers became permanently established in some stores. *This* year the demand exceeded the supply and with much trepidation I ordered from other sources. It was a good investment and I see now that the uncertainty of local crops make it necessary for bee-keepers to buy from each other in order to hold their trade.

I find a growing sale for chunk honey. It started with my having a lot of light weight sections. I cut them out, dropped a strip in a jar and filled up with extracted honey and *it* sold almost on sight. To economize on those sections, I finally had to divide each one into four pieces. Then I had numerous small orders for comb honey to be shipped as Christmas gifts. I was fearful of breakage, so finally arranged to send this combination honey instead, with much or little comb as was desired. It carried perfectly in jars, and producer, purchaser and consumer were delighted.

I find, too, that there is an amazing local demand for wax. Druggists will take a limited amount, but it must be extra clean and yellow. That which came from my solar wax extractor is suitable for this trade. I have secured forty cents a pound for it. Farmers' supply stores always have it on hand. I have not learned for what special purpose except for grafting wax. I had an inquiry this spring for half a ton and sold my little at thirty-five cents a pound. I believe the retail price is fifty cents, so the merchant still makes a good profit.

One of the advantages of bee-keeping is the small capital demanded at the start. This is perhaps why so many people go into it. Twenty-five dollars is said to be an ample sum for any beginner. But from this small capital there is naturally a correspondingly small return. An interest of five or six per cent. is considered a safe and reasonable profit from an investment. Eight per cent. and upward is secured frequently in some industrial lines, but here is involved grave risks and uncertainties that may at any time cause a deficit instead. Six per cent of $25 is $1.50 even ten per cent is only $2.50—certainly not an income capable of constructing many air castles.

Since my start with bee-keeping, I have kept minute account of every cent expended and taken in. My first expense was $17.64, with $9.01 return at the end of the season. As correctly as I can figure (without counting labor), my net returns have averaged about fifty per cent. Some years nearly two hundred per cent., others very much less depending on the season conditions and whether I had made any costly blunders. Yet the whole amount of money handled is embarrassingly small.

Now some one will ask, "If your profit from a few colonies is so good, why not go into it no a larger scale? Multiply the number of colonies by 100 or 200 and have an income of real proportions, and a tale worth telling!"

Ah—that is another story! Frankly, I am not yet skilled enough. The experience gained in handling a few colonies is not sufficient for an apiary of hundreds. The conditions of all kinds are different. There are problems of production, trained labor (no one person could handle such a proposition) harvesting the crop—machinery—equipment—and house for storing it. Packing, shipping and marketing all are on a vastly larger scale. A gradual increase that keeps pace with experience is healthy progress, but a sudden expansion too often bewilders and confuses the operator. Also it is generally acknowledged that the larger the business the smaller is the net profit per unit.

One devoting his whole time to bees must secure a labor income of proper porportions, or the business will starve him out. Where bee-keeping is a side issue, the time and labor are not counted so seriously. I for instance, consider it balanced by the honey used at home and given away. I went into bee-keeping for the special purpose of having honey to eat in quantity, and I have it. One of my pet theories is that a successful bee-keeper must be passionately fond of honey. The ideal of perfect honey is ever luring him on—rich, matchless color, with a fragrance and flavor he dreams of.

Make your business your pleasure! Every trade, every profession has its advantages and disadvantages; its trials, problems; delights and joys. Bee-keeping is no exception.

John O. Buseman, whose apiaries are near the Delaware River, then gave his experience of "Moving Bees for a Fall Crop."

Moving Bees For Fall Crop.

By John O. Buseman.

The majority of bee-keepers of Pennsylvania are probably not aware of the possibilities of the wonderful honey-flow which we have in the southern part of Philadelphia and Delaware Counties along the low lands of the Delaware River. There are fully 1,200 colonies which feed on this wide field of fall flowers, the leading one of which is a yellow flower known as the burr marigold. Another source of supply, while not equal to that of the marigold, may be found in the goldenrod, smartweed and the aster.

Bees kept in this locality the year around get very little or no surplus in the spring, however, and must be fed to put them in condition for this flow, which commences usually about August 23d.

On August 20th, last, another bee-keeper and myself had occasion to examine 200 colonies which we have located in the Malvern Valley in Chester County, which, of course, were divided between three yards and selected therefrom one hundred strong colonies in ten-frame two-story hives. On these we placed top screens and in the evening we tacked entrance screens on fifty-five of them, so they could be moved the next morning without difficulty.

We had engaged an auto truck to be there six A. M., but it did not arrive until 7: 30. With the assistance of the two truckmen, we started to load them on the trucks, and before each colony was lifted upon the truck a cup of water was thrown over the top screen. My past experience had taught me that by giving this water nearly all danger of suffocation or overheating was removed. The hives were placed three-high on the truck, and extra bodies and covers were placed on top of these and on the sides. By the time the truck was loaded, which was finished at about 8: 45, the thermometer registered eighty-six in the shade.

The distance to the range was twenty-five miles, which distance we covered in an hour and a half the best and smoothest road. Upon our arrival the temperature had gone up to eighty-nine, which might give one a fairly good idea of the weather conditions, under which we were laboring, and what it must have meant to the bees inside the hives.

As the bees were being taken off the truck we poured more water through the top screens, and threw some in the entrances. We arranged them in rows of twelve each, and then put on super covers, leaving the top screens on. This was done very quickly, so that we could pull off the entrance screens and immediately liberate the bees.

We started back to Malvern Valley at 12: 15. That evening we tacked entrance screens on the remaining forty-five colonies, they having had top screens already on them, as I have previously mentioned, and loaded these the next morning under the same trying conditions, the temperature in fact being slightly higher. This time, however, it was an hour earlier when we started to load, and arrived at the range an hour earlier in consequence, than the day before.

After liberating these bees we whiled away our time the best we could, allowing them time to settle. We then took off the top screens of the fifty-five colonies which were shipped the day before, and after having finished these we did the same with those which we had just moved. Upon looking over them we found only the one colony in which about a handful of bees had been smothered.

The success of this operation may be attributed mainly to the spraying of water over the bees, as these two days were of the hottest of the season.

No more attention was paid to the bees until August 27th when they were gone over, when an extra body, containing eight frames with full sheets of foundation, was inserted, one frame being taken from the upper story and placed in the empty body, thus making nine frames. Two of the colonies were found queenless, into which new queens were promptly introduced. The flow had just begun, which could be detected by the few scattered cells of yellow honey, this being the color of the nectar from the burr marigold. A week later I examined

the bees again and found that they had drawn out considerable foundation and had the top body nearly full. Of course, colonies varied in this respect.

In this flow, the nectar comes in so fast driving the queen to the lower story, thus eliminating the use of excluders.

On September 10th I found a great deal of the honey already sealed and about thirty of them required additional bodies.

Three colonies were run for comb honey, being given partly drawn sections left over from the clover flow, and on this date were found to be nearly finished, there being five supers to each colony. The photo shows how the bees worked in this locality, this frame containing only foundation on August 27th.

The week following September 10th somewhat lessened the flow, due probably to the weather having become cold and at the end of this week the bloom of the burr marigold had run its course. The following week the weather became warmer and the bees gathered considerable from aster. On October 10th we began to extract and realized twelve hundred pounds. That evening the temperature dropped to such a degree that the honey became chilled, and upon trying to extract the next morning we found it impossible to do so without breaking the combs. We therefore, took all the honey off the hives and had it hauled, together with thirty-five colonies, to Malvern Valley, where the honey could be heated and extracted.

All told, our crop of honey was 4,200 pounds. This included 380 sections of comb honey. The cost per load for truck hire was $10.00, four loads in all, two there and two return making $40.00. Other expenses amounted to $9.00, making the total cost of moving the bees $49.00.

The bees were gone over and packed for the winter, all having fifty pounds or over of honey for stores.

The question whether it is advisable to move bees for certain flows, was discussed pro and con. Freeman A. Reeder, who has had experience in Louisiana, said it pays to move them and further said a northern bee man can not call himself fully equipped unless he has a southern apiary.

One of our foremost queen breeders, J. B. Hollopeter, then spoke on "The Value of a Good Queen."

Value of a Good Queen.

J. B. Hollopeter, Rockton, Pa.

The queen being the very soul of the colony, every bee-keeper should be vitally interested in the subject of good queens. Neglect of this one thing causes thousands of dollars annual loss to the bee-keepers of our state, a loss which might be prevented if more attention were paid to the kind of queen in every colony. There should be a comprehensive yet simple record kept of each colony, for thus only can we know the good from the bad. A good queen like a good mother is known by her children.

It is through the queen we breed for better stock, and whether the advance is retarded more or less by lack of control of male parentage, yet the primary advance will be through the queen. It is an undeniable fact that much progress has been made in race improvement by selection of the best queens and breeding from them. Such an instance is the case of Dr. C. C. Miller. After giving proper credit to the season and management, yet the Doctor's good queens had much to do with the results, and I might say that it takes a bee-keeper of more than ordinary ability and perseverance to have queens of such uniform quality in practically all the colonies in the apiary. Most bee-keepers are satisfied to have a few extra good queens and a whole lot of medium and low grade ones, which cut down the average honey yield from what it might be if all colonies were equal to the best. If our best colony gives say 100 pounds of honey and the average is only 50 pounds, it is plain to see that if the entire apiary had come up to the best colony our pocket book would fill up more too. One of the prime factors in improving is the queen. Last spring we placed a queen in each of two colonies from the stock of two breeders. So far as could be done each had an equal chance, both built up strong, the one gave ninety-six sections of buckwheat comb honey, the other gave twelve sections.

Successful wintering depends largely on good queens. A good queen will bring her colony to the winter with a large force of young bees and resume egg laying at the proper time in the spring and bring a large force of workers to the harvest. Protect a colony in every way and without a good queen it will not be profitable, but with a good queen a colony may even winter successfully without protection. What might be done if we combined good queens with adequate protection and care. The percentage of winter losses would diminish wonderfully, and the honey crops increase. Most bee-keepers are aware of the importance of good young queens but by carelessness many colonies are allowed to remain poor yielders, poor winterers, when by requeening with better stock the net profits would in many cases double.

A good queen comes in handy to supply the loss of a queen in a colony hopelessly queenless, as such colonies would otherwise perish. In such cases a queen is worth the price of a colony.

In improving our stock and breeding for a superior race the value of a queen may be great. A good breeding queen may be worth several hundred dollars.

Good queens are needed in making artificial increase.

A queen whose bees are more or less immune or resistant to foul brood is very much to be desired. In the treatment of European foul brood by the Alexander method, much of the success depends on a young queen of good resistant stock.

I might mention other traits as non-swarming, gentleness, etc., all of which we are trying to get through the queen and which increase the worth of the queen. It might truthfully be said that around the queen centers all there is in apiculture. Let us have good queens in every colony.

Q. How do you requeen for foul brood? I follow the Alexander method to the letter. I put the new queen in twenty-one days after dequeening.

Q. What becomes of the foul brood? Don't know.

Q. Will it return if bees get down to the bottom of the cells where the infection was? Not often.

The Auditing Committee reported the treasurer's accounts correct.

The Committee on Resolutions reported as follows:

1. That a vote of thanks be extended to Prof. Sanders for securing the use of the room for holding this meeting.

2. That the members of this Association bring their influence to bear on the legislators toward securing liberal appropriations for the carrying on of apiculture in this State.

3. That the Association tender a vote of thanks to Pres. Surface and Sec. and Treas. Klinger for their untiring efforts in working for the good of the Association and the able way in which they handled their positions of trust.

4. That the Association extend a vote of thanks to all of the speakers at this meeting for the able manner in which they have handled their various topics and the sacrifice of their time in coming here for the benefit of the members.

5. That we desire to express our sincere sorrow and regret for the removal by our Brothers Dr. I. W. Mayer, of Willow Street, Lancaster County, and John S. Palmer of Germantown, Philadelphia County.

6. That we thank Brother Buseman for the able way that he has handled the question box at these meetings.

Signed J. B. Hollopeter,
Franklin Brunt,
Walter F. Fisher,
Committee.

Additional Resolutions.

Harrisburg, Pa., March 3, 1917.

Whereas, A great sorrow has come to our beloved brother bee-keeper, Vice-president, and former Pennsylvania State Inspector, Mr. George H. Rea, in the loss of his good wife; therefore, be it

Resolved: That we, the members of the Pennsylvania Bee-keepers' Association and visitors in annual session assembled, this third day of March, 1917, A. D., hereby express our profound sympathy with Brother Rea and family, and wish

for them that solace and comfort which can be given by the all-wise Father; be it further

Resolved: That we recognize the efficiency and ability of Mr. Rea, and the great service he rendered to the bee-keepers of Pennsylvania in inspectional and educational work in apiculture, and thank him for the same, wishing him abundant continued success in his field of service under the Federal Government; be it further

Resolved: That these resolutions be signed by the bee-keepers present and forwarded to Brother Rea, with the expression of our sincere sympathy and good wishes.

Signed by all the members present.

Dr. H. A. Surface then gave the closing address on "Saving Honey and Soil Fertility."

Soil Fertility and Saving Honey.

By H. A. Surface, D. Sci., President Pennsylvania State Bee-Keepers' Association.

Soil fertility is undoubtedly the greatest feature in agriculture, and will be the chief element in winning the present war; while a result of obtaining it in the very cheapest and best possible way will be immense quantities of honey going to waste in the form of ungathered nectar, while children cry for sugar and dyspetics moan from the necessitated use of less digestible sweets. To produce from the soil the food and raiment necessary for the sustenance of mankind requires fertility, labor, seeds or plants and implements.

Let us consider the fertility problem, with its relations to the by-production of honey. While there are many minor elements in small quantities enter into the composition of plants, the three great essentials are potash, phosphoric acid, and nitrogen. These are the chemicals (wrongly called "elements") necessarily entering into a "complete" fertilizer. Let us discuss each in reference to its increase in the soil.

Potash.—This element of plant food is very abundant in most soils, especially in soil derived from limestone and granite or feldspar. There may be hundreds of tons per acre, but it is (fortunately for future generations) not all available at once. It is mostly made available through cultivation. It can be laid down as true, within reasonable limits, that the more the soil is cultivated the greater is the supply of potash thus set free or rendered available.

This becomes a reward for good husbandry. In fact, there is so much potash in most soils, and it is so readily rendered available through cultivation, that it is in most cases not necessary to purchase more.

Phosphoric acid.—This element of plant food is very important, because so necessary, although in but small quantity. It is derived from bones and certain kinds of rocks or minerals, and when raw but merely ground it is sold as "floats" or raw ground phosphate rock. To become available for plants it must be dissolved. An acid is needed for this purpose. In nature, the organic acids form decaying vegetable matter or humus, or the acids of plant growth, do this, but in the artificial production of fertilizer sulfuric acid is used to dissolve it, and the product is then sold and used as "acid phosphate" or dissolved rock.

If rightly managed the phosphorous is the only element of plant food that the husbandman need buy. It is not added or increased by any plant growth, and cultivation does not greatly affect its availablility, as with potash. That which is deep in the soil can be brought up by certain root crops, like radishes, cow-horn turnips, etc. There is advantage in having it brought nearer the surface of the soil where most plant root growth takes place.

If there is but little vegetation present in the soil it is best to buy the dissolved form, called "acid phosphate," but if used with manure or if there is a heavy sod to turn down, the cheapest form of phosphoric acid is as "floats" or the raw ground rock. Therefore, it pays and pays well, to grow an abundance of vegetation to make it possible to utilize the cheaper form of phosphorous, and also to get as much humus in the soil as possible. Humus is of great value. It holds moisture in dry weather, permits more drainage in wet weather, makes it warmer in winter and cooler in summer, as is seen in the leaf mold of a forest.

It is cheapest and best to produce that humus by growing the very *crops that are the best honey-producers,* as will be shown below.

Nitrogen.—This is the great plant tonic food. It is to the plant what protein is to animals. It puts "pep" into the organism. It makes great plant and leaf growth,—producing blossoms and nectar, but is not a "balance" plant ration, and alone does not produce the substance and strength of seeds that can be produced with the addition of potash and phosphoric acid. Nitrogen is the most abundant element in nature, and at the same time the most expensive for the husbandman to buy in the form of commercial fertilizer. Also, while it is the element most essential to plant growth, yet it is the one least necessary to buy if obtained by natural means. It occurs in practically all animal and plant tissues, in the excreta of animals, in certain mineral deposits as "nitrates," and in the air as the most abundant atmospheric element. The best nitrogen in commercial fertilizers is from nitrate of soda, which at present sells at about one hundred and twenty-five dollars per ton, and as this is only about sixteen per cent nitrogen, it makes the actual nitrogen fertilizer cost about forty cents per pound. About three-fourths of the air is nitrogen—being a pressure of about twelve pounds of actual nitrogen on every square inch of the earth's surface, or in valuation amounting to something like four million and four hundred thousand dollars ($4,400,000) worth to the acre. We who own so much can afford to be wasteful and drop that little four million, but we should and can save something out of the four hundred thousand. The great trouble (or perhaps, advantage) is that this atmospheric nitrogen is not available for plant growth until put into a form that can be dissolved and used by the plants. This can be done in two ways: Artificially, by extreme electric heat uniting lime and nitrogen, making calcium nitrate, and naturally by the growth of the Legume plants, or members of the botanical family *Leguminoseæ,* such as the peas, beans, lentils, alfalfa, clovers, (red, white, crimson, white sweet, yellow sweet, burr, etc.), alsike, vetches, lespedeza, cow peas, field, peas, soy beans, locust trees, Wistaria, etc.

Now, here is where the honey commences to show. It is only by means of the leguminous plants that the husbandman can find it possible to make use of this great supply of atmospheric nitrogen, draw it down into the soil, and make it into a form available for the growth of his plants. The legumes have little nodules or lumps on their roots which are the abodes of myriads of bacteria which are the means of transforming atmospheric nitrogen into available nitrogen, and consequently are called "nitrofying bacteria." It is due to the effects of these infinitesimal microsopical organisms that the soil becomes more fertile wherever the legume plants grow. This is true, whether it be around an old locust stump, in a clover sod, or along a bank where sweet clover has grown. The longer a legume plant of any kind grows in any soil the more fertile does that soil become, because of the increased humus and nitrogen and the multiplication of nitrofying bacteria.

These bacteria are present in all soils to some extent, and the continuous growing of a legume will cause them to develop in great numbers, but it is desirable and profitable to provide for their immediate presence in quantity, to hasten their beneficial results. This is done by bringing them to the field, which process is called "inoculation." This can be done in two ways: By using "pure cultures" or small tubes of bacteria in liquid, furnished by the Federal Government or by commercial firms, and by soil taken from places where the same kind of plant has recently grown well. The latter method is the better because the more certain. The writer has tried both, and must acknowledge no evidences of sucess with the "pure culture" method, although some persons report success with it.

To inoculate the soil, the ground should be well prepared for seeding, and the inoculating soil, taken from a place where the same kind of plant has grown well, should be thinly scattered or sown over the ground, using a half bushel or more to the acre. The sowing of this soil should be done on a cloudy day or toward evening, so the sunshine will not kill the bacteria before they are covered, then the ground should be harrowed at once and sown with the desired seed and harrowed again, or the soil can be sown, followed immediately by the seeding and then the harrowing.

It must be remembered that the bacteria that thrive on the roots of one kind of leguminous plant do not always thrive on another kind, as there are different species of these nitrofying bacteria, and each has it own kind or plant or group of plants, and may not transfer to others. For example, the bacterium of red clover can not be used to inoculate for alfalfa, while that of the sweet clovers is all right for alfalfa inoculation. However, after any legume plant has grown in any

kind of soil, that soil is more fertile to grow any other kind of plant that may be started there, as the transformed nitrogen is available for any kind of plant. This is why corn grows well where a clover crop is turned down.

Another very important point is that most legumes will not thrive in an acid soil, and to get satisfactory growth it is necessary to use lime to sweeten the soil. This is best applied by broad-casting or drilling in after plowing the ground and just before inoculating and seeding. The presence of lime, with some phosphroic acid and potash, is the explanation of such rank growth of the sweet clovers and other plants on cinder piles, ash dumps, and along railroads where cinders are used to fill. This shows why, to get a good growth of clover of any kind, alfalfa, soy beans, cow peas, Canada field peas, vetch, etc., it is by all means best to both lime the soil and inoculate it with the nitrofying bacteria. Even for beans and peas in the garden this principle is true.

Now, the entire point of this long story is that *the plants that will make the most fertile soil, in the shortest time, at the least expense, are also among the best for honey production.* Fortunate, indeed, is the bee-keeper, for both soil fertility and honey, who has near him a blooming field of alsike, white clover, alfalfa, sweet white clover, sweet yellow clover, vetch, etc., or a grove or row of yellow locust trees. With the legumes alone a bee-keeper could succeed well; without them nearly all would fail.

While it is generally agreed that it does not pay to plant for honey alone, it certainly does pay well to plant for (a) soil fertility, (b) forage, (c) hay, (d) humus, (e) soil protection, and (f) honey. Each of these is to be had chiefly from the legumes. Let it be remembered that the fertility in plants is not lost by feeding them to live stock. In other words, a crop of clover, cut just after blooming (i. e., after the nectar has been gathered), and fed as hay, has the greatest possible nourishing value for live stock, and is just about as valuable for fertilizing the soil after being fed (if the manure is properly treated), as though it were left to rot on the ground.

The legumes are especially valuable as cover crops, and should be worked into very possible crop rotation. With a green cover crop, like red clover, alsike, crimson clover or vetch, on the ground during the winter and spring there is much less loss of fertility by erosion and the leaching away of the soluble nitrates or elements of soil fertility. In fact, the time will come when any man who lets any of his ground pass the winter bare or without a cover crop will be regarded as negligent as he who leaves his farm implements out during the same season. Also, good seed is so high in price and hard to get that it pays every man well to grow his own seeds as far as possible. In doing this the production of honey can be made a very important secondary feature.

There is a definite season of the year for seeding with each kind of legume which must be recognized, and best results come only by putting in the right seed at the right time. This extends from red and white clover and alsike sown on wheat and rye ground in February and March, Canada field peas drilled with oats in early spring, soy beans or cow peas just after corn planting, or crimson clover the early part of July, and alfalfa early in August, to vetch in September. But of this, more must be said in detail at a later time.

Summary.—Plant the legumes at their proper seasons, lime, inoculate, produce soil fertility, forage crops, hay, and honey, and protect the soil. H. A. S.

Arrangements were made for summer meetings to be held in the following places: Cumberland County, Chestnut Hill, Lancaster County, and York County.

On motion, adjourned. H. C. KLINGER, *Secretary.*

Summer Meetings, 1917.

A number of field meetings were held during the spring and summer throughout the State. About 75 meetings were held through the extension work of the State, covering practically the entire State. These meetings were held under the auspices of the State and consisted of demonstrations of up-to-date work in bee-keeping, with special

stress upon producing greater crops of honey during the war crisis and also how to eliminate the foul brood diseases.

The work met with popular approval and results showed that even in a few individual cases the returns were almost as much as the State expends in a year in this direction.

Several meetings were held by the State Association, and one by Philadelphia Association in conjunction with the State Association.

The one held in Lancaster County was the largest field meeting ever held—over a hundred bee men present. It was held on August 16th, in L. K. Hostetter's apiary. Dr. Surface presided. Addresses were made by J. P. Kirk on "My Experience with Buckwheat"; by Miss Ella Brinton on "Possibilities of Girls on Farms"; and Dr. Sterner on "Bees and Fruit." Mrs. Dr. Surface showed "How to Use Honey in the Household," and Dr. Surface spoke on the "Value of Raising Sweet Clover" as a soil renovator and a honey plant. J. R. Rambo then demonstrated how to "Introduce Queens." The day was delightful and the lunch that Mr. Hostetter spread was greatly enjoyed.

H. C. KLINGER, *Secretary.*

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